

MANUAL
OF
PARTISAN WARFARE.



*George Washington Flowers
Memorial Collection*

DUKE UNIVERSITY LIBRARY

ESTABLISHED BY THE
FAMILY OF
COLONEL FLOWERS

T. P. Devorex

1886

"Hushed in the roll of the rebel
drum

Its standards are furled

And its cannon are dumb

1880

1880

1880

1880

1880

6 20 18
MANUAL
OF
MILITARY RECONNAISSANCES,
TEMPORARY FORTIFICATION
AND
PARTISAN WARFARE,
FOR
OFFICERS OF INFANTRY AND CAVALRY,
CONTAINING :

- 1ST. MILITARY RECONNAISSANCES;
 - 2D. ELEMENTS OF MILITARY TOPOGRAPHY;
 - 3D. ELEMENTS OF TEMPORARY FORTIFICATION;
 - 4TH. PARTISAN WARFARE.
-

TRANSLATED FROM THE FRENCH OF

GEN. LeLOUTEREL,

BY

JOHN M. RICHARDSON, B. S.,

LATELY

MAJOR OF THE 21ST REG'T N. C. TROOPS, C. S. A :

NOW, PROFESSOR OF MATHEMATICS IN THE

GEORGIA MILITARY INSTITUTE,

MARIETTA, GA.

ATLANTA, GEORGIA:

J. McPHERSON & CO., PUBLISHERS.

1862.

Entered, according to Act of Congress, in the year 1862, by
JOHN M. RICHARDSON,
In the Clerk's Office of the Northern District of Georgia.

RBR
Conf
12ms
#26

CERTIFICATES.

HEAD-QUARTERS SEVENTH BRIGADE, }
ARMY OF POTOMAC, Jan. 28, 1862. }

Maj. Jno. M. Richardson, 21st North Carolina Reg't., Manassas :

SIR:—I have read the "Manual of Military Reconnaissances and Partisan Warfare" submitted to me, with much pleasure. It is an excellent translation of the valuable work of General LeLouterel, and in my opinion will be extensively useful in the Army and in the Confederate States, by the dissemination of the true principles of the art of war among the junior officers, and also the non-commissioned officers and intelligent privates of the army, and to those who may hereafter embrace the military profession.

As the South, to maintain her nationality, and command respect, must become a military people, too much attention cannot be bestowed on good elementary and general treatises on military subjects.

Works of this character are more extensively useful for their brevity, like the one you have compiled.

Wishing you every success,

I am respectfully and truly

Your obt servant,

J. R. TRIMBLE,
Brig. General.

MAJOR RICHARDSON:—I have read your observations on the subject of Intrenched Camps, and find them to contain important hints and true principles for defensive armies. They will be a useful chapter in your "Memoir."

Yours respectfully,

J. R. TRIMBLE,
Brig. General.

Manassas, Jan. 28th, 1862.

Letter from Col. R. H. Chilton to Mr. A. Morris, Bookseller and Publisher, Richmond, Va., relative to the "Manual of Military Reconnaissances, Temporary Fortification and Partisan Warfare."

[COPY.]

RICHMOND, VA., March 7th, 1862.

Sir:—I have read the manuscript sent herewith, and find it very interesting. While full enough for all practical purposes, it explains with simplicity and clearness enough to meet ordinary intelligence, all the arrangements necessary to be taken by the field engineer, as also

the important duties of advanced posts and pickets. The book may be read by all with decided advantage, and its general circulation would tend greatly to give a more intelligent and efficient tone to our army. The book ought to sell well, especially if put into a convenient form for transportation, and at such a price as would induce privates, as well as officers, to purchase.

I am, sir, respectfully,
Your ob't serv't,

R. H. CHILTON, A. A. G.

To Mr. Morris, Publisher, Richmond, Va.

STATE OF GEORGIA,
ADJUTANT & INSPECTOR GENERAL'S OFFICE,
MILLEDGEVILLE GA., April 8, 1862. }

Maj. John M. Richardson, Geo. Military Institute, Marietta, Ga.

MAJOR:—I have examined the "Manual" carefully, and it gives me pleasure to say, that it is well adapted to the purpose designed, and a valuable contribution to our military publications. If closely studied by our officers, not only of Infantry and Cavalry, but also by our volunteer artillerists and staff, we will have an intelligent army.

Very respectfully,
Your ob't serv't,

HENRY C. WAYNE,
Adjutant & Inspector General.

TABLE OF CONTENTS.

ALPHABETICAL INDEX.

	ARTICLE.
Abattis.....	109
Advanced Guards.....	120
Affluents.....	69
Ambuscades.....	122
Angles, means of measuring.....	70
Attack of Posts.....	128
Auxiliary Defences.....	108
Balloons.....	69
Basins.....	69
Bank Right.....	69
Bank Left.....	69
Bastion Fort.....	90
Batteries.....	111
Battle of Pultowa.....	114
Bomb Proofs.....	115
Bridges.....	126
Calculation of Embankment and Excavation.....	101
Camps, Intrenched.....	118
Cantonments.....	117
Chains of Mountains.....	69
Communications.....	12, 34
Counterforts.....	69
Confluents.....	69
Coupures.....	82
Considerations, Military.....	14, 41
Conclusion.....	130
Defences, Auxiliary.....	108
Defiles.....	69
Defilement of Works.....	93
Description of Works.....	82
Description, Physical.....	7, 24
Dispositions, Military.....	16, 43

Details, Historical.....	18, 57
Definition of Topography.....	67
Dimensions of Works.....	82
Distances, Means of Measuring.....	70
Emplacement of Works.....	93
Embankment, Calculation of.....	101
Entrance of Work, Method of Closing.....	103
Epaulements.....	83
Escorts.....	121
Excavation, Calculation of.....	101
Examining Ground, Manner of.....	120
Extract from Mahan.....	59
Flanks.....	69
Fleches.....	84
Fort Bastion.....	90
Foraging Parties.....	125
Fords.....	126
Form of Works.....	82
Gaps.....	69
Geographical Terms used in Topography.....	69
General Principles of Partisan Warfare.....	117
Gorges.....	69
Guards, Advanced.....	120
Guards, Grand.....	119
Ground, Method of Examining.....	120
Historical Details.....	18, 57
Houses.....	111
Indented Line.....	88
Intrrenched Camps.....	11, 61
Itineraries.....	78
Left Bank.....	69
Line, Indented.....	88
Line, Rogniat's.....	113
Lunettes.....	86
Mahan, Extract from.....	59
Mamelons.....	69
Manner of Examining Ground.....	120
Map.....	2
Marauds, Organized.....	124
Maxims of Napoleon.....	129
Means for Measuring Distances, Angles, Slopes.....	70
Memoir.....	2
Methods of Closing Entrance of Works.....	103
Military Considerations.....	14, 41
Military Dispositions.....	16, 43
Military Reconnaissances, Objects of.....	1
Military Memoir, Model of.....	19
Mitre.....	89
Mountains, Chains of.....	69

Mouths of Rivers.....	69
Napoleon, Maxims of.....	129
Observation	58, 116
Orders.....	5, 21
Organized Marauds.....	124
Palisades.....	110
Patrols.....	123
Parties, Foraging.....	125
Partisan Warfare, General Principles of.....	117
Physical Description.....	7, 24
Posts, Picket.....	119
Posts, Attack of.....	128
Priest Cap.....	89
Proofs, Bomb.....	115
Pultowa, Battle of.....	113
Reconnaissances, Military.....	1
Redans.....	85
Redoubts.....	87
Rivers, Mouths of.....	69
Rivers, Right Bank of.....	69
Rivers, Left Bank of.....	69
Rogniat's Line.....	113
Roads.....	126
Sentinels.....	119
Slopes, Means of Measuring.....	70
Statistics.....	9, 29
Surprises.....	127
Thalweg.....	69
Topography, Definition of.....	67
Topography, Utility of.....	67
Topographical Terms.....	69
Trace of Works.....	98
Utility of Topography.....	67
Valleys.....	69
Vallons.....	69
Vedettes.....	119
Villages.....	112
Works, Description of.....	82

ANALYTICAL TABLE OF CONTENTS.

CHAPTER I.

RECONNAISSANCES.

	ARTICLE.
Object of Military Reconnaissances.....	1
Map and Memoir.....	2
Orders.....	5
Physical Description.....	7
Statistics.....	9
Communications.....	12
Military Considerations.....	14
Military Dispositions.....	16
Historical Details.....	18
Model of a Military Memoir.....	19
Observation.....	58
Extract from Mahan.....	59

CHAPTER II.

MILITARY TOPOGRAPHY.

Definition and Utility.....	67
Geographical Terms used in Topography.....	69
Chains of Mountains.....	69
Ballons.....	69
Flanks.....	69
Counterforts.....	69
Mamelons.....	69
Gaps.....	69
Gorges.....	69
Defiles.....	69
Valleys.....	69
Vallons.....	69
Basins.....	69
Thalweg.....	69
Affluents.....	69
Confluents.....	69
Mouths of Rivers.....	69
Right Bank.....	69
Left Bank.....	69
Simple Means for Measuring Distances }.....	70
Slopes, and Angles }.....	70
Itineraries.....	78

CHAPTER III.

ELEMENTS OF TEMPORARY FORTIFICATIONS.

Description, Form and Dimensions of Works.....	82
Coupures.....	82

Epaulements	83
Fleches.....	84
Redans.....	85
Lunettes	86
Redoubts	87
Indented Line.....	88
Mitre, or Priest Cap.....	89
Bastion Fort.....	90
Emplacement and Defilement of Works.....	93
Trace of Works.....	98
Calculation of Embankment and Excavation.....	101
Methods of Closing the Entrance of a Work.....	103
Auxiliary Defences.....	108
Abattis	109
Palisades	110
Houses.....	111
Villages	112
Rogniat's Line.....	113
Battle of Pultowa.....	113
Batteries.....	114
Bomb Proof.....	115
Observation	116
Intrenched Camps.....	116

CHAPTER IV.

PARTISAN WARFARE.

General Principles.....	117
Cantonments.....	118
Grand Guards.....	119
Picket Posts.....	119
Sentinels.....	119
Vedettes	119
Advanced Guards.....	120
Manner of Examining the Ground.....	120
Escorts	121
Ambuscades.....	122
Patrols.....	123
Organized Marauds.....	124
Foraging Parties.....	125
Roads.....	126
Bridges.....	126
Fords.....	126
Surprises	127
Attack of Posts.....	128
Maxims of Napoleon.....	129
Conclusion.....	130



PREFACE.

Gen LeLouterel's work, (4th edition, Paris, 1850), of which this is, in the main, a translation, consists of five parts, viz: 1^o Un aperçu des Reconnaissances militaires; 2^o Des notions indispensables de Geometrie; 3^o Des elements de Topographie militaire; 4^o Des elements de Fortification passagere; 5^o Des donnees sur l'art de la petite guerre, ou Guerre des postes.

The first, with the exception of a few questions, is translated in full; some additions have also been made: the second is omitted altogether: the third is given only in part, though many important additions have been made to the portion translated: the fourth is given in full, but greatly enlarged: so also the fifth.

In preparing this little work, Mahan, Jebb, Brabazon and Du Four have been consulted; the article on Intrenched Camps is chiefly from Du Four.

The chapter on Temporary Fortifications is not as extensive as Mahan's Field Fortification, nor is it intended to supercede that valuable work in the hands of professional engineers; brief, clear and easily comprehended, it contains all that is necessary for infantry and cavalry officers, and, in an article on Intrenched Camps, supplies a serious deficiency in Mahan's treatise.

The chapters on Reconnaissances, Topography and Partisan Warfare, are regarded as superior to Mahan's Out-Post Duty, &c., because briefer, clearer, more explicit, better arranged, and not clouded by wordy flights. There is a vagueness, a cloudy indefiniteness, about this little work by Mahan, which greatly obscures what is really valuable in it. Nevertheless, it is a useful little book, and worthy of being in every junior officer's library.

This "Manual" gives to infantry and cavalry officers, and to intelligent non-commissioned officers and privates, all

the essential information which Mahan attempts to deal out in two volumes; and, it is no disparagement to Mahan, nor undeserved praise to Le Louterel, to say, that this work, in all that it aspires to, is superior to Mahan's. It is but justice to Mahan, however, to say, that he is unhesitatingly quoted in several important particulars in the following pages, as the reader will see for himself.

It will be as useless as tedious for the translator to point out the various additions he has made to Gen. Le Louterel's work; what he has done, has been attempted in the spirit of the original.

To Sergeant-Major Fole, of the 21st Regt. N. C. T., I am under obligations for assistance in copying the drawings.

JNO. M. RICHARDSON.

Camp Martin, near Manassas, Va., Jan. 30th, 1862.

GEORGIA MILITARY INSTITUTE,)
October, 1862.)

This work would have appeared some time ago, had it not have been for the great difficulty experienced in getting engravings executed, and for some unavoidable delays that have occurred in the press work. The engravings were executed by *amateurs*, and on *type metal* plates. The *style* of the engravings (the lines only being sunken), and the *character of the metal*, give rise to great difficulties in printing them, and it is trusted that this explanation will be a sufficient apology for any defects in the impressions of the diagrams.

To Cadet T. F. Barnum I am indebted for much zealous assistance in getting the engravings finished. The small map of Sideville, and many of the other diagrams, were executed by him.

J. M. R.

CHAPTER I.

Reconnaissances.

GENERAL PRINCIPLES.

1. Military Reconnaissances have two distinct purposes in view: 1°, The study of the physical features and the improvements of a given district, with the view of learning its peculiarities of hill and dale, field, river and forest, mountains, passes, roads, bridges, fords, buildings, &c., and their relative positions; or, in technical language, the *topography* of the district: 2°, The collection of the statistics of the district, showing its resources in men, horses, wagons, cattle, grains, forage, &c.

Moreover, a reconnaissance should have a military object in view; that is to say, the officer in charge of it should always suppose himself in the presence of the enemy, and, accordingly, indicate the dispositions to be taken for resisting or conquering him; point out what places must be held to secure his retreat, and show in detail how each important position can be defended, approached and attacked.

2. Every reconnaissance gives rise to a military memoir, (see model No. 19, and following,) and when possible a sketch or hastily drawn map of the country examined; but when the sketch cannot be furnished, the memoir should be so clear and explicit that we may dispense with the sketch.

3. On the other hand, a map, however well executed, does not answer the requirements of a military reconnaissance, for there are many very im-

portant details that can be made known only in writing. A memoir and a sketch, then, are the complements of each other; but a good memoir without a sketch, is always more useful than a sketch without a memoir.

4. A military memoir is divided into seven parts:

1° A copy of the order in virtue of which the reconnaissance is executed;

2° A physical description of the district examined;

3° The statistics of the villages and hamlets which it includes;

4° The communications which traverse or lead into it;

5° Military considerations upon its offensive and defensive properties;

6° Military dispositions to be made in consequence of the order received;

7° Historical details of the military events, ancient or modern, of which the district examined has been the theatre.

Orders.

5. Special and detailed orders should be given to the officer charged with the reconnaissance, the orders emanating from the proper authority.

6. The orders should be clear, precise and sufficiently detailed, in order that those to whom they are addressed may perfectly comprehend the object of their mission. (See No. 21, and following.)

Physical Description.

7. This should include a statement of the general configuration of the ground, showing whether it is open and easy of access, or cut up by ditches,

hedges, and walls, covered with forests or heaths, dry or marshy.

The description should contain also the exact or approximate indication of the maximum and minimum slopes of the mountains, their height and direction; the aspect and form of the valleys and "vallons;" the nature and extent of the ponds, lakes, marshes and sheets of water; the volume, aspect and encasement of the rivers, creeks and canals; the variations which the different seasons of the year undergo; the nature of the soil; what kinds of trees grow in the forests; the properties of the air and water relative to the health of men and animals; the kinds and qualities of building materials, as stone, timber, metals, &c.

8. When the reconnaissance is made in a maritime country, state the form of the coast; whether it presents downs and cliffs; the height of the cliffs and the nature of the rocks composing them; whether the beach is marshy or covered with pebbles; the shore, level or covered with ridges.

Make known all important particulars with regard to the tides and prevailing winds, and to the temperature at different seasons; the creeks, bays, roads and natural ports; the points of landing or of refuge for maritime and river navigation; the banks and bars found along the coast, or at the mouths of the rivers.

Statistics.

9. Describe, in the first place, the principal improvements in the district reconnoitered; follow this by particulars with regard to the height, complexion, character, manner of living and habits of the people, and their elementary instruction.

10. Describe the nature of the cultivation of the

soil and the productions; whether they are sufficient, insufficient or superabundant for the wants of the inhabitants during the year; the ratio between the yield and the seeding. State, also, what obstacles or facilities may be found, in the civil administration of the district or the local habits of the people, in applying all the resources to the wants of troops on march or in cantonment.

11. In addition to this statement of facts, this article should be terminated by a numerical table showing the amount of the resources of every kind. (See No. 33.)

Communications.

12. Gather and detail all possible information with regard to paved, macadamized, planked and earthen public roads—also railways, canals, neighborhood roads, and important by-paths. With regard to each road, state its width, slopes and other accidents—the length and width of the defiles through which it passes; whether bordered by trees, ditches, hedges; the nature and extent of the forests through which it passes, &c.; the ease or difficulty of getting over it at different seasons.

Ascertain the distances between the most important places; the time necessary to travel over those distances; the difference, in broken and mountainous countries, between the time of going and that of returning; the means which the localities offer to maintain, improve, build and destroy, at will, the various roads.

Roads parallel to the one reconnoitered, and those connecting them with it, should be indicated or described with a particularity proportionable to their importance in a military point of view.

13. Observations upon canals, rivers and creeks,

considered with reference both to navigation and war, should have for their principal objects: the nature, elevation and slope of the rivers; the constant or alternate command of one bank over the other; the most suitable points for establishing bridges and other means of passage; the situation of existing bridges, their dimensions and the nature of their construction; the mills, dams, factories, &c., upon the water courses, and within reach of the principal roads; the ferries and boats, the length of time they require to cross, and the number of men, horses and wagons they can transport; the fords their direction, the nature of their bottom, their ordinary length, width and depth, and the means of destroying them; the annual floods and height thereof.

Military Considerations.

14. Describe all important military positions in the district reconnoitered; their importance for the offensive as well as the defensive; the number of men necessary to defend or attack them; the means of strengthening them by coupures, barricades, abattis or inundations; the proper places to post a convoy or escort; the advantage to be obtained from villages, hamlets, farm-houses, churches and cemeteries as places of protection and safety; the localities whence provisions, forage, wood and water are to be obtained for each position.

15. On coasts, indicate the positions where landings can be effected, and describe the means which should be taken either to prevent them or to oppose the subsequent movements of an enemy.

Military Dispositions.

16. Explain, as clearly and briefly as possible,

as well for the offensive as the defensive, all that should be done to resist an enemy or conquer him, according to his movements, which we should always suppose to be what we would do were we in his place.

17. These questions should be treated in the conditional and upon supposition, as already stated. Avoid relating facts accomplished, and describing marches and combats useless for the purposes of instruction, and which prove nothing since we can arrange our facts to suit ourselves.

Historical Details.

18. State as nearly as possible the epoch at which history commences to make mention of the wars, ancient or modern, of which the country has been the theatre; the fields of battle and the positions of the armies on them; and, in parenthesis, cite the works, printed or written, whence the information has been obtained.

Model of a Military Memoir.

19. Place upon the cover and on the first page of the memoir, the following as the title:

FOURTEENTH MILITARY DIVISION.

TWENTY-FIRST REGIMENT OF THE LINE.

Martin, Sergeant-Major.

20. The copy of the order, in virtue of which the work is undertaken, will be entered upon the third page of the memoir, not counting the cover.

ORDER.

21. Sergeant-Major Martin is ordered to reconnoitre and sketch the village of Sideville and its environs within a radius of 750 yards, so as to present a square of about 1,500 yards on a side.

22. He will suppose this village is destined to canton a detachment of fifty infantry, the regiment being at Octeville; he will suppose also, the enemy master of Pieux and able at any moment to march upon Cherbourg.

23. The sketch will be accompanied by a memoir containing, in the following order:

- 1° A copy of the present order ;
- 2° A physical description of the district ;
- 3° Its statistics ;
- 4° Its communications ;
- 5° Military considerations ;

6° Military dispositions, comprising : the establishment of the detachment in the village of Sideville, the number of posts and advanced sentinels to establish in order to guarantee it against surprise, the instruction to be given them, the means to be employed to maintain their vigilance, night and day ; the place of assembling in case of an alarm ; the assistance that can be drawn from the accidents of the ground and the buildings for the defence of the village in case of an attack, and the plan of retreat to the regiment in case it is forced ;

7° Historical details with regard to the military operations, ancient or modern, of which the village and its environs have been the theatre.

By command of COL. A. B.,
Comd'g 21st Regiment of the Line.
C. D., Adjutant.

PHYSICAL DESCRIPTION.

24. The village of Sideville is situated in the northern part of the county of Cherbourg; the surrounding country is traversed by the river Divette, which empties into the harbor of Cherbourg. The mean width of this river is about five yards, its depth one yard: but during rainy seasons it often overflows its banks, and inundates the fields, in the midst of which it gently flows over a clayey bottom, bordered with willows and birches, forming a great number of sinuosities.

25. The country is hilly, broken, furrowed by small streams of water and ravines, bristling with banks of earth, green hedges, and small groves of cedars and elms.

26. The country is very much cut up into small fields, each of which is surrounded by banks of earth and thick hedges of hawthorn.

The village is composed of about fifteen houses grouped near together, and many others isolated and remote; it contains a stone church, and has a flour mill quite near it; all upon the left bank of the Divette, and at the foot of a hill, the top of which is wooded, and about seventy yards above the level of the river.

27. The soil is generally fertile and well cultivated; the climate moist on account of its proximity to the ocean; the winter is mild, freezing weather being rare.

Contagious diseases are almost unknown; the prevailing winds are from the north and west; water good and abundant.

28. The country produces cedars suitable for building houses; and good quarries of granite, quartz, schistose and slate rocks, are abundant.

STATISTICS.

29. The inhabitants are strongly constituted, active, laborious and very industrious; the navy gets many excellent recruits there. Their manners are simple, and their character is generally mild; however, the men are somewhat addicted to drinking cider and brandy.

30. Elementary instruction is quite general; and, as there are many primary schools, but few of the inhabitants are unable to read and write.

31. The soil produces cereals of every kind, oleaginous and tuberculous plants, beans and peas, and an immense quantity of fruit, especially cider apples; the meadows are full of horses, oxen and cows of fine size. The productions are much more than sufficient for the support of the inhabitants, and annually they export to England large quantities of eggs, forage, poultry, and many animals.

32. The culture of the ground occupies the inhabitants nearly the whole year. An acre of ground requires about two bushels for planting, and yields 16 to 18.

Numerical Statement of Resources.

DESIGNATIONS.	Number.	Names of Villages, Hamlets and Houses.	Number of Families in each Village, &c.	Observations.
WHITE POPULATION.	1,000	Sideville.	20 D	
Males.	463			
Females.	537			
Males between 18 and 45.	175			
FREE NEGROES.				
Males.				
Females.				
Males between 18 and 45.				
SLAVES.				
Males.				
Females.				
Males between 18 and 45.				
PROFESSIONS AND TRADES.				
Doctors.				
Lawyers.				
Ministers.				
Male Teachers.				
Female do				
Merchants.				
Carpenters.				
Masons.				
Blacksmiths.				
Carriage Makers.				
Shoe do.				
Tanners.				
Tailors.				
RESOURCES FOR LODGING.				
Hotels.				
Public Halls.				
Private Houses.				
Houses out of Village.				

Numerical Statement of Resources.

DESIGNATIONS.	Number.	Names of Villages, Hamlets and Houses.	Number of Families in each Village, &c.	Observations.
BAKERIES.				
Pounds of bread cooked in twenty-four hours.				
MILLS.				
Grist.				
Wheat.				
Saw.				
Steam.				
Water.				
Wind.				
MANUFACTORIES.				
ANIMALS.				
Horses.				
Mules.				
Asses.				
Oxen.				
Cows.				
Sheep.				
Goats.				
Hogs.				
MEANS OF TRANSPORTATION.				
Two-wheeled wagons.				
Four do do.				
Boats.				
LANDS.				
Cultivated.				
Uncultivated.				
Cleared.				
In woods.				

Numerical Statement of Resources.

DESIGNATIONS.	Number.	Names of Villages, Hamlets and Houses.	Number of Families in each Village, &c.	Observations.
PRODUCTIONS.				
Maize.				
Wheat.				
Oats.				
Rye.				
Barley.				
Sweet Potatoes.				
Irish do.				
Turnips.				
Hay.				
Beans.				
Peas.				
Whiskey.				
Brandy.				

COMMUNICATIONS.

34. One public and five neighborhood roads traverse the district of Sideville.

35. The public road of Pieux is confounded with that from Cherbourg to Bricquebec, to a point about 250 yards beyond Martinvast Bridge, where they separate under an angle of 55 degrees, the Bricquebec road turning south, the Pieux, southwest, going along the right bank of the Divette to Saint Christopher le Foc, and then enters the basin of the Douve.

36. This road, which communicates by a branch with the Teurthéville-Hague, is made of rock, and is solid and practicable at all seasons, though a little muddy in winter on account of schistose character of the stone of which it is built; its mean width is about 10 yards. It is drained by two ditches, one on each side, a yard in width.

37. The Boulée road unites with the road from Pieux on the other side of Martinvast Bridge and leads to the Teurthéville-Hague road about 200 yards above the village of Sideville; it is from four to five yards wide, and although very muddy in winter, the inhabitants of Teurthéville-Hague prefer it to the road from Pieux because it is shorter. A stage starting from Sideville would make the trip to Octeville in 50 minutes, whilst it would require 60 by the public road; the return trip is shorter by five minutes on account of the descending grade to Martinvast Bridge. There is another small road, parallel to this, without name, which starts from the Sideville Church, and joins the Boulée before it reaches the Pieux.

38. The Teurthéville-Hague road branches at right angles from the public road at a point opposite Sideville, and at about 500 yards from it, and

about 5,000 yards from Octeville. It crosses the Divette on a stone bridge of three arches, each 6 yards long and 4 wide. The parapet is about 3 feet high.

This road is four yards wide, well kept up, and solid at all seasons, although generally included between dykes of earth, surmounted by hedges. After having traversed the village, it rejoins the Pieux road near Saint Christopher le Foc.

39. The Couperie road is narrow and deeply cut; small streams of water wash it into gullies throughout its length; it is steep and broken; and starting from the Teurthéville-Hague road, with which it connects, it leads to the top of the hills along the old road from Pieux, which appears to have been an ancient Roman road.

40. The Houguet road is the old one from Valognes to Beaumont; it intersects the roads from Pieux and Bricquebec, crosses the Divette upon a bad wooden bridge, about 700 yards from Sideville, is lost for some distance in the Teurthéville-Hague road, leaves it beyond the hamlet of La Vacheux, and leads to the road from Beaumont, near the village of Saint-Croix-Hague; this road, which is about four yards wide, is badly kept up, very boggy, and but little used.

MILITARY CONSIDERATIONS.

41. The ground upon which Sideville is situated, has on the right and left of the road from Pieux to Cherbourg, a hill from 50 to 60 yards high; that at the foot of which Sideville is located is too distant from the road to defend it well without artillery: the opposite one on the contrary, terminates at the road, and behind the dykes and hedges of that position 300 infantry could defend the

passage against an enemy marching from Pieux upon Cherbourg so much the better because the prairies through which the Divette flows, are impracticable on account of the ditches and hedges which bound each property, and which would force him to keep the road.

42. One hundred men placed in the three houses between Sideville and the road, the houses being loop-holed and placed in a proper condition for defence, would contribute powerfully to arrest the march of an enemy along the road, as he would then be exposed to a cross fire from the houses and the opposite height.

MILITARY DISPOSITIONS.

43. My first care on arriving at the village of Sideville, with the detachment under my command, and in case the enemy should not be in the environs, would be to divide it into parties and reconnoitre the village and neighborhood thoroughly; that over, as the houses are near together, I should billet my men by fours, and lodge myself in the centre, giving as a place of assembling in case of an alarm and for the daily calls for duty, the enclosure, planted with apple trees and surrounded by a hedge, in which the church is located.

44. In the nearest house to the church, where there is a primary school, I would establish a post of four men, with a corporal and drummer; moreover, I would establish three small advanced posts, consisting each of a corporal and three men; the first, at the point where the Teurthéville-Hague, the Boulée and Couperie roads unite, with a sentinel on the road from Teurthéville; the second, on Simon's farm, with a sentinel at the point where the direct path to Sideville branches from the Hou-

guet road; the third, in the nearest house to the road from Pieux, with a sentinel on that road.

45. These three sentinels placed where they can see as far as possible and be at the same time well concealed, would have for their duty to observe closely whether any party of the enemy coming from Pieux, should advance towards Cherbourg, either by the main route, or by the country roads parallel to it; in that case, the sentinel making the discovery, should hasten silently and at full speed, without making himself visible, to his post; the post should then fire to give information of the approach of the enemy, and go *au pas de cours*, to the rendezvous of the detachment.

46. At night the sentinels should occupy secure places, behind a hedge for instance, where the enemy could not reach them, but from which they could have a good view all around, and go easily to their posts without being exposed.

47. The sentinel of the police guard should be stationed in the church tower, and be instructed to keep a good look out all around during the day, and to listen attentively at night; at the first shot, or first cry of alarm, or rather at the first ringing of the church bell, the drummer of the picket post should beat the proper call. The sentinel in the church tower should give the alarm at the first sight of the enemy.

48. The sentinels would be instructed to arrest every one coming from or going towards the enemy, and take him to their posts, to be questioned and examined; and, in case any thing suspicious should develop itself, he would be sent to Sideville to me, whence I would send him under guard to Octeville.

49. I would see that my detachment kept their arms loaded and in good condition, and all their

equipments in perfect order and ready for instant use; the men on duty would not be allowed to take off any portion of their equipments or clothing at night, and the others required to keep on at least their pantaloons and every thing ready for immediate adjustment, so that the entire detachment may be under arms at the indicated place within three minutes after the first alarm.

50. In order to secure the vigilance of the posts and their sentinels, I would visit them, and have them visited, frequently, *and particularly at night*; and would adopt signals of recognition to replace the ordinary challenges, so as to avoid showing where the sentinels are posted—changing the locations every night to prevent surprises.

51. If the enemy should march upon Cherbourg by the main route, I would hasten with my entire party to that road to reconnoitre; if he is in force, I would divide my detachment into two equal parts, place one half on each side of the road in one rank, so as to offer less mark to the enemy's shots in my retreat to Octeville, and dispute his march, foot by foot, taking advantage of all trees and accidents of the ground to shelter my men, and enable them to deliver their fire with some certainty.

52. If I should be pressed closely by the enemy's cavalry, I would cut across the fields with my entire detachment, skirmishing the whole way, however, and with the greater advantage, because the cavalry could not clear the banks and hedges, whilst they would offer but little obstacle to infantry.

53. If, on the contrary, the enemy should advance by the country roads parallel to the main route, I would, at first, place my detachment in front of Sideville behind the banks and thick

hedges found there, and from which we could do much injury to the enemy before being driven back; in the same manner, I would dispute each field, foot by foot, until passing the village, when I would take the road leading from the church to the Bou lée, in order to retire to Octeville.

54. As soon as the enemy appears an officer, or some trusty man, would be sent at full speed to inform the commander of the regiment at Octeville, in order that he might have time to make his dispositions to receive him.

55. If the enemy should surprise my post near the road from Pieux, and, turning the village, cut off my retreat to Octeville by the main route and the Boulée road, I would retire by the Couperie, and gain the road from Beaumont to Cherbourg by Branville and Nacqueville.

56. Finally, if the village of Sideville is to support my detachment, I would collect the necessary provisions into magazines, in order that they might be distributed regularly and lawfully, allowing no pillaging, being well satisfied that order and system are the best means to secure subsistence for soldiers for any length of time. On the contrary, if the provisions come from Octeville, I would frequently visit the lodgings of my men, to see that the citizens had not been put under contribution by them.

HISTORICAL DETAILS.

57. The district of Sideville has never been the theatre of any military event.

Observation.

58. Some officer, superior in rank to the one



57. The district of Sideville has never been the theatre of any military event.

Observation.

58. Some officer, superior in rank to the one

charged with the reconnaissance, should, if possible, examine his labors on the ground itself, satisfy himself as to the correctness of his statements, and make a report upon the merits of the reconnaissance.

The following Remarks are condensed from Mahan's Treatise on Advanced-Guard, Out-Posts, &c. Chap. V.

59. No more important duty can be assigned an officer than that of conducting a reconnaissance, or of collecting and arranging all necessary information relative to any district within the sphere of military operations. Maps, however detailed and perfect, can not convey all the requisite information for planning an ordinary march, much less the operations of a campaign. These deficiencies of maps can only be supplied by an actual examination of the ground, and by gaining all possible information from the inhabitants.

60. The qualifications of an officer entrusted with this duty, should be great; an intimate acquaintance with geography, statistics, and topography being essential to its successful discharge. He should be clear headed and truthful; accustomed to see things as they are, and to tell briefly and clearly what he has seen. In making his report, he should separate what has fallen under his observation, from the information derived from others, adding circumstances of time and place with the utmost accuracy.

61. The officer selected for this duty, should ascertain in the first place *precisely what he is required to do*, and what should be done in case of certain contingencies that may be expected; and, in discharging the duty assigned him, and in making his report, he should keep clearly in mind the

specific character of his mission, and introduce nothing irrelevant.

62. Before going to the field of his labors, he should provide himself with a map, a telescope, pen, ink and paper, pencil, drawing instruments and some means for ascertaining distances and measuring angles; arriving there, or even before, he should, if possible, secure the services of good guides, and gain all possible information from the inhabitants.

63. Hunters, carriers, smugglers, &c., make the best guides; if none such can be found, resort must be made to the local authorities. Every effort should be made to enlist and retain the good will of those employed on this service; at the same time, they should be watched closely, and any attempt at treachery be punished severely.

64. A general view of the whole ground should first be taken, and then the several parts studied in detail. Roads, ranges of hills and mountains, rivers, creeks, defiles, woods, &c., should be particularly examined; all villages, hamlets, houses, mills, &c., along any given road, carefully designated—isolated houses described by reference to their peculiarities, and the side of the road they occupy. Important military positions should be sought for, and means of reaching, defending and attacking them given.

Give the names of localities with the utmost accuracy, and ascertain the distances between them.

65. A reconnaissance in the presence of an enemy is either to gain secretly a knowledge of his whereabouts and strength, or to force him to show his hand.

In the first case the reconnoitering officer must be escorted by a troop of light cavalry, and every precaution should be taken to avoid being cut off.

Under the protection of this escort, the reconnoitering officer endeavors to ascertain the position of the enemy and his strength; and, at the same time, studies the ground intervening between the two armies, with the view of determining its capability for favoring an advance upon the enemy, or of resisting an attack by him.

In the latter case, the officer goes out under the protection of a strong detachment of all arms; and, by irritating attacks upon the enemy, endeavors to make him call out his entire force and develop his plan of defence or attack.

Seizing a favorable moment, the reconnoitering officer notes the dispositions of the enemy's troops, the number of his guns in position or otherwise, the spirit of his troops as indicated by their alacrity to advance, or disposition to hold back, the promptness of their manœuvres, the character of the officers, and any thing else that he may deem note-worthy.

The detachment under whose protection the reconnoitering officer makes these observations, should be held well in hand, and not be allowed to be engaged so closely as not to be easily extricated; and as soon as he has gained the desired information it should be drawn off promptly, but in good order. Reinforcements should be at hand to check, if necessary, the pursuit of the enemy.

CHAPTER II.

Military Topography.

66. Not even an outline of Military Topography can be given here; nothing but a few definitions, directions, &c.

Definition and Utility

67. Topography is the art of representing, by conventional signs, on a plane, as a board, or a sheet of paper, and according to any required scale, the surface of the ground and all improvements on it, in such a manner, that, at a single glance, we can appreciate distances, recognize turn-pikes, railways, canals, country roads, paths, ditches, hedges, rivers, creeks, bridges, fords, mountains, plains, valleys, forests, fields, marshes, ponds, cities, villages, hamlets, houses, mills, factories, &c., &c., which traverse or cover it.

68. This definition may serve to give an idea of the subject, and show its importance relative to all military operations. It is, indeed, indispensable for the successful prosecution of war; without it there can be no strategetical combinations, no attack or defence, with any probable chance of success; he who fights upon ground that he does not thoroughly understand, is almost necessarily beaten, and there is no military enterprize, whether to seize, attack, or defend a position, that does not require a preliminary reconnaissance or some topographical knowledge of the district in which it is located.

Geographical Terms used in Topography.

69. *Chains of Mountains* are a series of mountains connected together and extending over great distances: as the Alps, the Andes, &c

The highest or culminating points are called peaks; and these take different names according to their forms: needles, if they are conical; teeth, if they are prismatic; "ballons," if they are globular. The slopes of the sides from top to base, are called *Flanks*.

Chains of mountains less elevated than the principal, but parallel to them, are called *Counterforts*. The range nearest the principal chain, being more elevated than the others, is of the *first order*; the next, of the *second order*, and so on.

When mountains are not more than 200 or 300 yards high, they are called *hills*, and their flanks *sides*; those from 100 to 200 yards high, are called "*mamelons*."

The deep depressions which sometimes separate contiguous mountains of a chain, and which serve as means of communication across them, are called *Gaps, Gorges, or Defiles*. *Valleys* are intervals between the bases of high mountains; *Vallons* narrow intervals between hills. Every valley or vallon, through which flows a stream of water, is called a *Basin*. There are principal and auxiliary basins. The basin of any river is the principal basin with respect to its system of tributaries, each of which has its own basin, and may itself be an auxiliary basin of some other river. Thus, the basin of the Yonne is an auxiliary or secondary basin with respect to that of the Seine, of which it is a tributary, whilst it is a principal basin with respect to its tributaries, the Armançon and Serain.

The principal stream of water in any valley or

vallon, is called the *Thalweg*, or *line of greatest slope*.

All rivers or streams emptying into another are called *Affluents*; and the place of union of any two streams, a *Confluent*.

The *Mouth* of a river is the place where it empties into some lake, sea, or ocean; the *Source*, its highest spring.

The *right bank* of a river is that on the right hand as you go down the river; the *left bank* is, then, the opposite side.

Simple Means for Measuring Distances, Slopes and Angles.

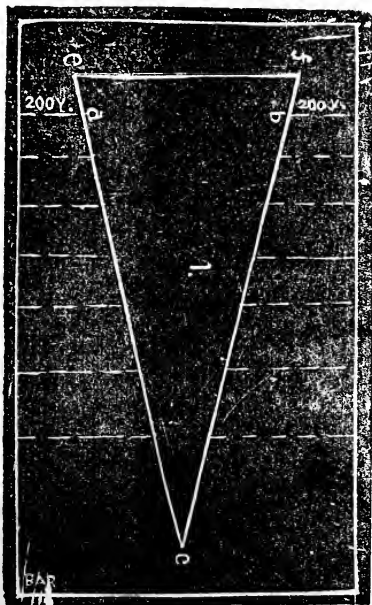
70. When there is sufficient time, and the necessary instruments are at hand, distances and angles can be measured with all necessary accuracy, but simpler means have to be adopted in a reconnaissance. The officer charged with it should know the length of his ordinary step. This can be determined by walking over any given distance and dividing it by the number of steps he has taken. The greater the distance, the more accurately will he get the length of his step. If it is short, by walking over it a great many times, and taking the mean of the results, he will know the length of his step with much accuracy. He should know, also, the distances that his horse passes over in a given time, at a walk, a pace, a trot, and a canter.

71. The distance, if considerable between two points, can be quite accurately determined by noting at one the number of seconds elapsing between the flash and report of a gun fired at the other, and multiplying by 1,112, which is the velocity of sound.

72. Scales for estimating distances can be readi-

ly made by marking off on a pencil, or small stick, held at arm's length from the eye, the portions intercepted between the rays passing from the eye to the head and feet of a man of average size, placed at different distances from 100 to 1,000 yards. In the same manner a scale may be prepared by observing a horse, a cow, an apple tree, a poplar, a single-story or two-story house, &c., at different known distances.

73. The best results are obtained from the stadia, which is made as follows :



Having a plate of ivory or metal, cut out an isosceles triangle; holding this at arm's length, the

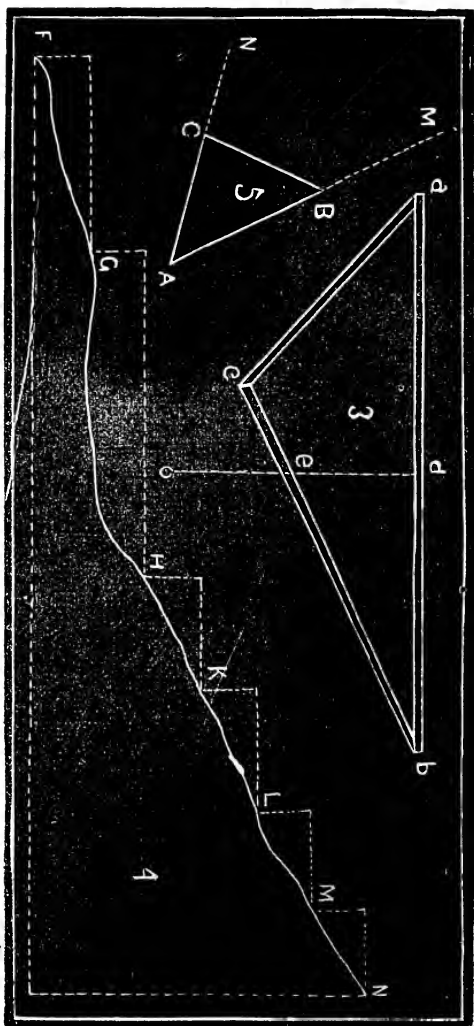
plate being vertical, look through the opening and mark the points A and where the rays passing from the eye to the head and feet of a man 200 yards distant, are just tangent to the long edges of the aperture or sides of the triangular opening. And by successively placing him at points 300, 400, 1,000 yards distant, other points can be determined and the scale completed.

More accurate instruments, which, however, are not always to be procured, are: The Stadia of Corporal Malphet, The Lunette of M. Porro, and The Telescope of M. M. Lerebour-Secretan.

74. For the following simple method of measuring the distance across a river, or to any remote object, as a battery, column of infantry, &c., I am indebted to Gen. J. R. Trimble, C. S. A.: Select a well defined object, f, as a tree, chimney, &c., on the opposite side of the river, and get, if possible, a level piece of ground near the bank to trace the base ac at right-angles to af the distance to be determined. At c, erect cd perpendicular to ac, and make cd any convenient distance. From d look towards f and mark with a stake the point of intersection b of ac and df. Measure ab and bc: then, from the similar triangles bed and abf, $cb : ab :: cd : af = \frac{ab \times cd}{cb}$

The longer the base ac, the more accurate the result; one person may make the measurements, but two get the result sooner. If a tape line is at hand, the right-angles c and a may be laid off by the proportions 6, 8, 10; but if no cord of any kind can be had, they must be measured approximately with the eye.

75. To measure slopes, make a small triangle abc, and from d the middle of ab suspend a plummet and mark the point e in which the thread in-



To use this instrument, stand at any point as *F* and sight over *ab*, taking care so to hold the instrument that the thread of the plummet shall intersect *bc* at *e*, and observe the point *G*, where the line of sight cuts the ground; move to *G*, and in the same manner find the point *H*; then *K*, *L*, *M*, &c. Now, if the eye is 5 feet from the ground, *G* is 5 feet above *F*; *H* 10 feet; *K* 15 feet; *L* 20 feet; *M* 25 feet, &c.; and measuring the distances *FG*, *GH*, &c., the profile of the line *FM* is obtained, also the slope.

76. To measure angles on the ground: from *A* the vertex, measure with a tape, any convenient distance *AB* towards one of the objects *M*, and *AC* towards the other; then, measuring *BC*, the sides of the triangle *ABC* are known, and can be laid off according to any scale.

The method of delineating the surface of the ground and representing the various objects on it, can not be described within the limits of this small work; it may be well to remark, however, that the work of sketching the district reconnoitered may be facilitated by referring all objects in it, when possible, to two lines drawn at right-angles to each other and connecting prominent points, either within or without its limits.

Itineraries.

78. Itineraries are accurate descriptions of roads giving distances between important points, the changes of direction, heights of hills, width, depth and direction of streams crossed by fords or by bridges; describing, also, all objects of interest or importance along the road and within short distances of it, its intersection with other roads, their direction, width, importance, &c.; whether bounded

by ditches, hedges, fences, woods, &c. Distances may be measured by the length of the pace, or more accurately with the pedometer. Heights may be measured by the barometer. The accompanying formula gives quite accurate results:

Let x = difference in height of two stations in feet

h = height of barometer at lower station;

h' = " " " at upper do

then, $x = 55,000 \times \frac{h-h'}{h+h'}$

If the mean temperature of the two stations exceeds 55° , increase this result by the $\frac{1}{440}$ part of itself multiplied by the excess; if the mean temperature is less than 55° , diminish the result in the same manner.

The Aneroid Barometer is more convenient in practice than the Mercurial, and is, perhaps, as accurate

The heights of all points are referred to that of departure—positive differences of altitude are entered on the right of the column representing the road; negative differences, on the left.

In the absence of a compass, changes of direction can only be indicated approximatively. See example.

ITINERARY.

[illegible]



CHAPTER III.

Elements of Temporary Fortification.

79. Works thrown up in haste, and under different forms, to defend the approaches to some post, as a village, hamlet, bridge, ford, road, house, &c., and which are to serve only some temporary purpose, are called *Temporary Fortifications*. They consist of essentially a bank of earth for the shelter of the defenders, and a ditch from which the earth is obtained. The ditch should, as a general rule, be on the side towards the enemy, so as to offer an additional obstacle to his progress; but, under certain circumstances, especially when there is but little time for their construction, and it is important to get the troops under shelter as soon as possible, the ditch, or trench, as it is then called, may be on the inside. The advantage of this arrangement is, that for every foot of depth of the ditch, two feet of shelter are obtained for the troops. When there are tools and men a plenty the ditch and trench may be dug both at the same time, and the dirt be used for making the bank or breast-work between them.

80. The nature and extent of the works required for the defence of any post, will depend upon its importance, the character of the ground, and the strength of the detachment. They usually consist of the following simple forms; 1°. *Coupures* or *Traverses* for blocking up roads, closing the entrance of a redoubt, or protecting the defenders of

any other work from a fire in flank or reverse; 2°. *Epaulements* at the forks of roads to cover a grand-guard, or an advanced post. 3°. *Flèches*, to cover a bridge or ford, or to close a redoubt. 4°. *Redans*, for the same purposes as *Flèches*, but preferable to them as they allow a fire in the direction of their *capitals*; (lines bisecting the angles of a work;) 5°. *Lunettes*, which have the same objects as *Flèches*, but admit of a fire at right-angles to their *capitals*; 6°. *Redoubts*, to defend posts which are open to attack on all sides; 7°. Auxiliary defences—as *barricades*, *abattis*, *chevaux-de-frise*, &c.

81. *Epaulements*, *Flèches*, *Redans*, and *Lunettes*, being open at the *gorge*, the side opposite to that at which the enemy presents himself, can not be employed to defend posts which are susceptible of being turned or attacked in the rear; for, if the enemy can take them in reverse, they are worth nothing, and the time spent in erecting them is lost.

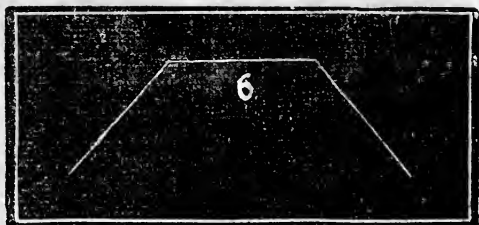
Description, Form and Dimensions of Works.

82. *Coupures* consist of a simple parapet (bank of earth,) and a ditch, disposed at right-angles to the road to be blocked up, their length depending upon the width of the road; the ditch should be from 2 to 4 feet deep, and as many wide; the earth is thrown outwards without any other arrangement than to form a kind of breastwork, behind which the defenders may fire and be at shelter.

Coupures should, if possible, be placed between houses, walls, hedges, or other obstacles, behind which sharp-shooters may be placed to defend the ditch and prevent the enemy from an escalade.

Traverses for closing redoubts and protecting the defenders of a work from a flank or reverse

fire, need not have any ditch, the dirt for their construction being supplied from the ditches of the redoubt, and should have a length, height and thickness, dependent upon the dimensions of the general work, and the special object of their construction.



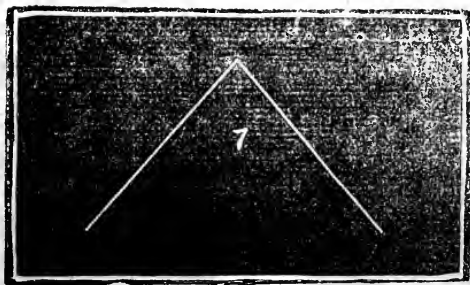
83. Epaulements, fig. 6, are like coupures, composed of a ditch and parapet of similar dimensions; they are rectilinear, and have two or three faces according to the number of avenues of the post they cover. The length of each face depends upon the strength of the detachment. (See No. 92.)

An advanced post should not construct an epaulement, unless it has to occupy the position for some time, is liable to be surprised by cavalry, and has its flanks well protected by impracticable ground.

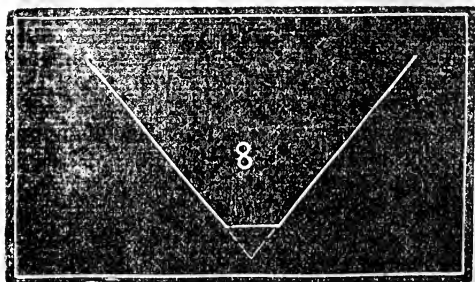
84. Flèches, fig. 7, have two sides, and resemble an inverted V; the angle should not be less than 70 degrees nor more than 100; the sides may be from 20 to 60 yards long.

85. Redans, fig. 8, are flèches with the acute angle cut off by a short face, called a *pan coupé*; the faces have the same length as flèches.

86. Lunettes, fig. 9, are flèches with flanks. The

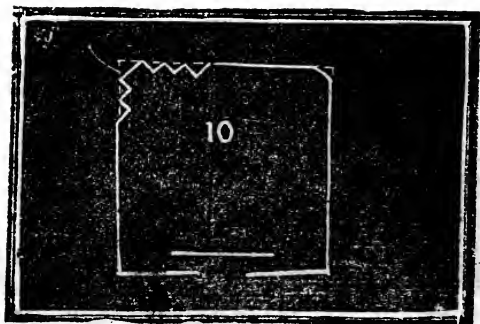
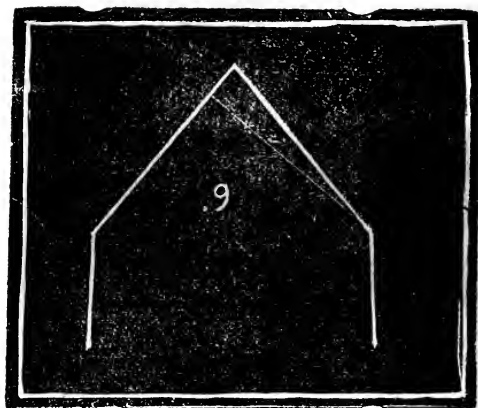


angle of the faces is from 70 to 100 degrees; those of the faces and flanks, from 130 to 150 degrees.



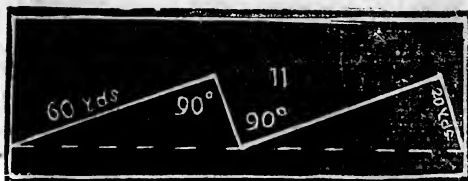
The faces may be 40 to 60 yards long; the flanks 20 to 40. The flanks may or may not be parallel to the capitals.

87. Redoubts are usually square, but may be of

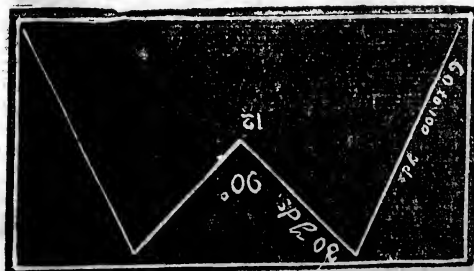


any figure. The square form is the simplest and most easily constructed. Fig. 10.

Some times one angle is cut off by a *pan coupé*, and the adjacent faces *broken* for a short distance.



88. "The indented line, fig. 11, serves to convert the direct fire of a straight line, into a flank and cross



fire, and is, therefore, frequently substituted for it." Mahan.

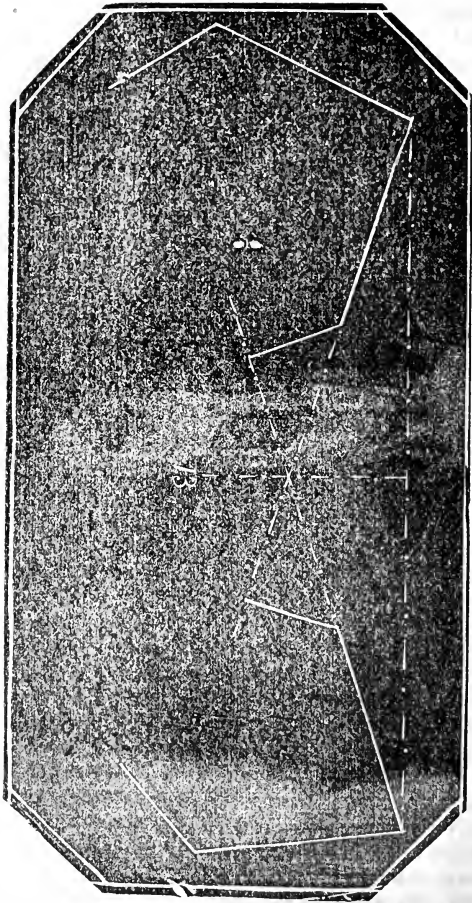
89. "The *Mitre* or *Priest Cap*, fig. 12, is a modification of the *flèche*; the short sides make an angle of 90 degrees with each other, and are about 30 yards long; the long sides make angles of from 70° to 100° with the short sides, and are from 60 to 100 yards long." Mahan.

90. "The bastion fort satisfies more fully the conditions of a good defence, than any other work; but, owing to the time and labor required for its construction, it should be applied only to sites of great importance, which demand the presence of troops during the operations of a campaign. Fig. 13.

The plan of the fort may be a polygon of any number of sides; but for field forts, the square and pentagon are generally preferred.

To plan a work of this kind, a square or pentagon is laid out, and the sides bisected by perpendiculars; a distance of one-eighth of the side is set off on the perpendicular of the square, and one-seventh, on the perpendicular of the pentagon; from the angles of the polygon, lines are drawn through the points thus found; these give the direction of the *lines of defence*; from the salients of the polygon, distances, equal to two-sevenths of the side, are set off on the lines of defence for the *faces*; drawing from the extremity of each face, a line at right-angles to the other line of defence, gives the *flanks*; the interior extremities of the flanks are connected by the *curtain*.

The side of the polygon is termed, the *exterior side*; the line bisecting it, the *perpendicular*; the angle at the salient, the *flanked angle*; that between face and flank, the *shoulder angle*; that between flank and curtain, the *angle of the curtain*; the portion of the work included between two adjacent

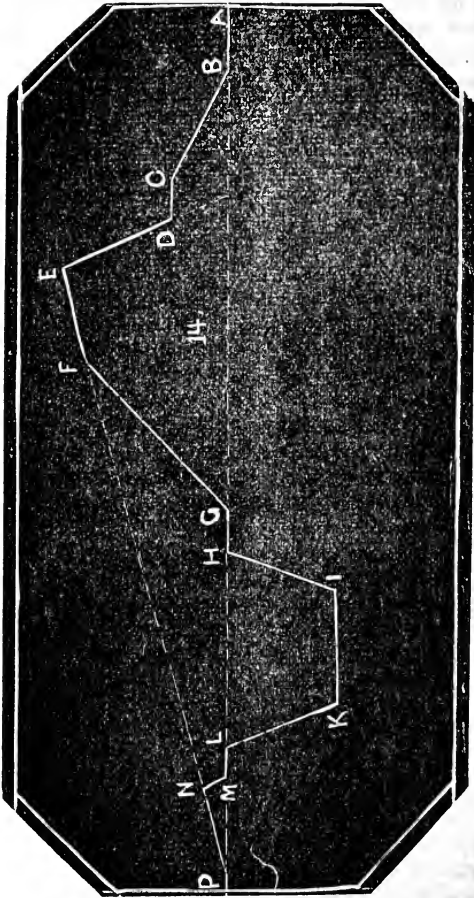


capitals, is called a *bastion front*, or simply, a *front*. Bastion fronts have neither *dead angles* nor *sectors without fire*; the salients and all the ground within reach of musketry, are swept by direct, flank and cross fires. There is one point in this system, however, which demands special attention; *the ditches of the faces must be prolonged until they meet, and all the earth between them and the ditches of the flanks and curtain, be removed, to prevent the formation of a dead angle along each face near the shoulder.*" Mahan.

91. All field works consist of a *terre-plein*—or the free interior place within them, some times called also, the *parade*;—a *banquette*, for the defenders to stand on; a *parapet*, to protect them against the enemy's fire; a *berm*, to prevent the earth of the parapet from falling into the ditch; a *ditch*, to furnish earth for the banquette and parapet; and sometimes a *glacis*, to bring the ground directly in front of the ditch more completely under the fire of the defenders.

The accompanying figure, 14, giving a section or profile of a work, will serve to make it better understood; A B is the *terre-plein*; B C, the *slope* of the *banquette*; C D, the *tread* of the *banquette*; D E, the *interior slope* of the *parapet*; E F, the *plongée*, or *superior slope* of the *parapet*; F G, the *exterior slope* of the *parapet*; G H, the *berm*; H I R L, the *ditch*; H I, the *scarp*; I K, the *bottom*; K L, the *counter scarp*; L M, the *berm* of the *glacis*; M N P, the *glacis*. The intersection of the interior and superior slopes of the parapet, forms the *interior crest* or *magistral* of the parapet; the intersection of the superior and exterior slopes, the *exterior crest*.

92. The tread of the *banquette* should be two feet wide for one rank of defenders, and four feet



wide for two; the height of the banquette is dependent upon the height of the parapet, the magistral being always four and a half feet above the tread. The base of the slope of the banquette should be twice its height. The parapet should not be less than eight feet high, nor more (except in the case of bastion forts) than twelve feet. The thickness of the parapet estimated along a horizontal line drawn perpendicularly to the exterior crest, should not be less than three feet, to resist musketry, and not less than nine to twelve, to resist artillery.

The exterior slope is that naturally assumed by the earth when thrown into a pile; the superior slope produced, should not pass more than three feet above the counter scarp, unless there is to be a glacis; nor should it pass below the crest of the counter scarp. Care should be taken in arranging the superior slope, not to make the interior crest too weak. The base of the interior slope should not be greater than one-third the height of the crest above the tread; the earth being retained at this steep slope by a turf, hurdle, gabion or other revetment. The length of the magistral is determined at the rate of one yard for every man for one rank of defenders, (first deducting the reserve, which should be at least one-fifth of the whole;) or one yard for every two men, if there are to be two ranks, and five or six yards for every piece of artillery. The berm should be as narrow as possible.

The width and depth of the ditch are regulated by the quantity of earth required for the constructions, but should be at least two to four yards deep, and as many wide. The height of the glacis and the width of its berm, depend upon the slope of the *plongée*, and the excess of earth furnished by the ditch. The slopes of the scarp and counter scarp,

should be as steep as the earth will admit; and steeper, if they can be revetted.

In enclosed works, the terre-plein should be large enough to allow fifty or sixty square yards for each gun, and one and a half or two square yards for each man; allowances should be made, also, for traverses and magazines.

The parapets of bastioned forts may be from 14 to 24 feet high, and the exterior sides from 125 to 600 yards long.

Emplacement and Desilement of Works.

93. Every work should be so placed as to command the ground or object which it is intended to cover; its elevation, or relief, such, that its magistral should be at least five feet above any ground the enemy might occupy, and eight feet above the terre-plein; and be at the same time exempt from enfilade and plunging fires. When this is the case, the work is said to be *desiled*.

94. In selecting positions to be fortified in broken and mountainous districts, care should be taken, that the location be not overlooked by any eminence within cannon shot, that the enemy might occupy. If there are any such, they should be seized and fortified also. It some times happens, however, that locations commanded by heights, which may be seized by, or be already in the possession of, the enemy, have to be fortified. In such cases, the principal lines should be laid out, so as to bring a direct and cross fire upon all avenues by which the enemy might advance, and so as to allow him only a direct fire against them. *The utmost care should be taken so to locate them as to prevent him from taking up a position in the prolongation of any of them.* If this can not be avoided, then

the defenders along such lines must be protected by traverses. The *relief* of the entire work, parapet and traverses, should be such as to protect the defenders from plunging and enfilade fires. The work is then *defiled*. If the relief of the parapet is made sufficiently high to give the requisite protection, the *defilement* is said to be *direct*; when traverses have to be employed, it is *reverse defilement*. "The *defilement* of field works is not indispensable to a good defence; nor is it generally practicable. It is, however, not only a conservative means, but it also inspires the assailed with confidence; for the soldier regards with distrust the strength of his position, when he finds himself exposed to the view of the enemy from an elevated point." Mahan.

95. The following profiles of works constructed on different grounds, will show the methods of securing protection from plunging or other fires. See plates 1 and 2.

Plate 1, fig. 1. The relief of a work constructed on the summit of an elevation, the ground descending in every direction, should not be more than $6\frac{1}{2}$ or 7 feet; to make the parapet higher, would be a waste of labor.

2. On horizontal ground, the relief should be at least 8 feet. Balls fired horizontally by infantry would strike the parapet about 5 feet above the ground; fired at an angle of one or two degrees, would graze the interior crest; fired horizontally from mounted men, would strike the *plongée*.

3. If a *flèche* had to be constructed upon ground sloping from the salient to the gorge, the ground occupied by the enemy sloping at the same angle towards the work, the relief should be at least 8 feet to protect the troops from balls fired parallelly with the slope of the ground.

4 and 5. If the ground slopes from the gorge to

the salient, and continues to slope in the same manner from the work to that occupied by the enemy, the relief should be the same as in the last case, 8 feet; but if the ground occupied by the enemy is horizontal, or sloping towards the work, the defenders towards the gorge and extremities of the flanks or faces may be reached by the enemy.

To remedy this, instead of increasing the relief of the work, it may save time and labor to sink, or dig out, the *terre-plein*; or to erect a traverse perpendicularly to the capital at the place where the salient ceases to protect the defenders.

Plate 2, fig 1. If the ground on which the *fêche* or lunette has to be constructed, is such that one part of the *terre-plein* BC towards the gorge is horizontal, and the other AB sloping towards the salient, and that occupied by the enemy be horizontal or inclined towards the work, the relief should be 8 feet at least; but even then the enemy's shots might reach the defenders on the horizontal part of the *terre-plein*. The remedy for this case is the same as the preceding; sink the *terre-plein*, or erect a traverse.

2. If the *terre-plein* DE slopes from the salient towards the gorge, whilst EF is horizontal, the ground occupied by the enemy being horizontal or sloping towards the work at an angle of 15 degrees, a relief of 8 feet will be sufficient to cover the defenders.

3. Finally, if we have to construct a lunette whose capital is parallel to heights within range, and that slope towards the work at angles of 20 to 25 degrees, we may give the relief an extraordinary elevation of 10 or more feet, taking earth from the *terre-plein* for that purpose; or construct a traverse A, along the capital, from the gorge to the salient.

96. There are, then, three methods of protecting the defenders of a work from enfilade and plunging fires: *increasing the relief*; *sinking the terre-plein*; *constructing a traverse*.

The elevation of the relief requires much time and labor, and many tools; the necessary tools can not always be had, and the relief is usually kept within the limits of $7\frac{1}{2}$ and 10 feet, being seldom more than 8 feet.

The sinking of the *terre-plein* furnishes at the same time earth for the parapet, and allows a part of that from the ditch to be applied to the glacis; in this case steps have to be cut for ascending the the banquette.

Traverses are an excellent means of protection, when there is time to construct them, but they take up a great deal of room; they should not be joined to the salient, because that part, called a *dead angle*--angle not flanked--being already weak, could not be defended at all were the traverse joined to it. A traverse erected along the capital, terminates, therefore, at the foot of the banquette.

97. Following is the method of defiling a work: Plate 3, figs. 1 and 2.

Let A B C D E be the plan of the interior crest of a lunette, of which the faces B C and C D are to be defiled from the dangerous points H and I to the points F and G about 20 yards from the exterior of those faces respectively. (It is usual to defile works to points about 20 yards beyond the face farthest from the dangerous point, or 20 yards beyond the gorges of open works.) At B and D drive stakes, also at L and M; O and P mark the stakes driven at B and D; cut off the stakes at L and M 3 feet above the ground; look over each one in the direction of the opposite dangerous point, and mark the points Q and R, where the line

of sight, tangent to the dangerous point, cuts the stakes O and P; then add 3 or 4 feet to the heights Q and R, and the height of the interior crest along those faces will be obtained.

When the crest thus obtained is so high as to involve too much labor in its construction, and a traverse has to be erected along the capital of the flèche or lunette, or along the diagonal of a square redoubt, or parallel to two of its faces, the height of the traverse necessary to protect each face from a reverse fire, is obtained in the same way. The traverse must be so high that all balls passing over it from a dangerous point, must also pass over the crest on the opposite side of the traverse. The method is evident from the diagram.

A dangerous point is any height from which an enemy may reach the defenders of a work by direct firing with musketry or artillery.

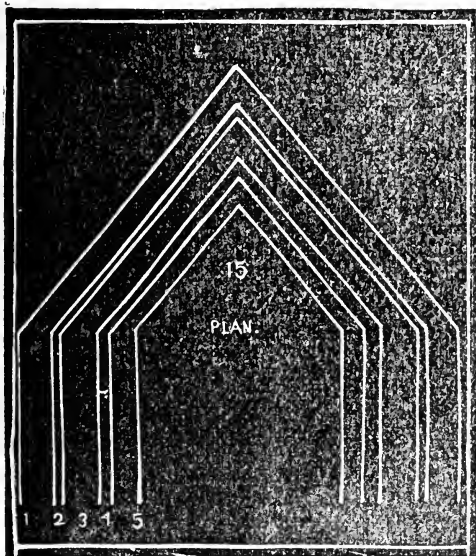
The Trace of Works.

98. Every work is measured along the magistral or line of fire, and that is determined by the number of defenders.

99. When the emplacement, form and height of the parapet of the different parts, are determined, a stake is driven at each extremity of the right lines that mark the plan of the slope of the banquette, the banquette, parapet, berm, ditch and glacis; then between the two stakes of each line a small furrow is made by means of a cord stretched between them, and some instrument for trenching. Fig. 15.

These lines should be parallel, and corresponding lines on each side of the capital should intersect on it.

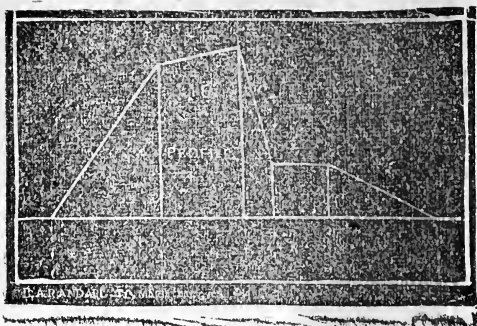
100. The lines of the plan or the base having



been drawn, profiles at right angles to the direction of the parapet must be constructed, at intervals varying with the height of the crest at different points.

The profile is thus made: having drawn a line perpendicular to the crest of the parapet, at each intersection of this line with one of the plan, drive a stake, and cut it off at a point above the ground

equal to the height of the line at that point. Join the extremities of these stakes with stout lathes, and connect the corresponding points of adjoining profiles with cords. The relief of the parapet varies, being less on elevated ground, impracticable and naturally defiled. Fig. 16.



Calculation of the Embankment and Excavation.

101. The earth of the ditch serving for the construction of the parapet, the banquette and its slope, it is important to know in advance how much the banquette and parapet will require in order to determine the dimensions of the ditch.

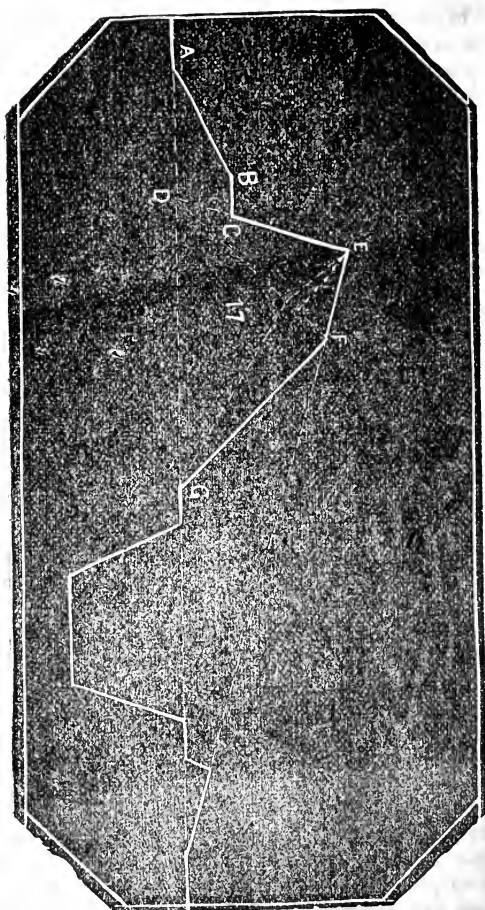
Earth newly thrown up occupies a greater volume than in its natural state, varying from 1-12 to 1-8 of the original bulk; hence the cubic content of the ditch should be about 1-10 less than that of the covering mass—parapet and banquette.

The relation between the embankment and excavation involves equations difficult to resolve for those who have not mastered that branch of mathematics; but a result sufficiently correct for all practical purposes, can be obtained by processes within the reach of every one. (See fig. 17.)

The profile of the embankment consists of a trapezoid A B C D, (this figure differs, in most cases, so little from a trapezoid, that it may be regarded as one,) and a trapezium D E F G; the area of the trapezoid is equal to the half sum of the two parallel sides B C and A D, multiplied by its altitude; that of the trapezium to the length of the diagonal D F, multiplied by the half sum of the perpendiculars drawn to it from E and G. The sum of these two areas is the area of the profile, and multiplying it by the length of the magistral, the volume of the covering mass will be obtained.

[NOTE. The volume obtained above is too great, the true content being equal to the product of the profile, multiplied by the length of the path its center of gravity describes in generating the covering mass; but approximate results, only, are needed here.]

Diminishing this result by 1-10 of itself, and the volume of the ditch is obtained. The length of the ditch being known, from the length of the magistral, assume the width at top and the depth; then dividing the volume of the ditch by the product of its length, width at top and half its depth, the quotient will be the width at bottom. If this is too great for the stability of the scarp and counter-scarp, the width at top, or the depth, or both, may be diminished; if the result first obtained is smaller than the stability of the scarp and counter-scarp requires, the width at top, or the depth, or both, may be increased.



In this way, a few trial calculations will soon give the unknown dimension with sufficient accuracy. If a glacis is to be constructed, the volume of the embankment, without diminishing it, may be used at once for determining the dimensions of the ditch.

102. In order to have the work executed as promptly as possible, the ditch should be divided into lengths of about four yards each, and to each part should be assigned five hands: one to loosen the earth; two to shovel it on the parapet and banquette; one to spread it in layers; and one to ram it. In ordinary earth these five men ought to pick, shovel, spread and ram twenty cubic yards per day. When the height, however, up which the earth has to be thrown is considerable, not so much can be done; and it is frequently necessary to leave a ramp extending nearly to the foot of the counter-scarp, in order that the earth may be carried up in hand, or wheel-barrows, baskets or bags.

It is seldom that troops, especially those on outpost duty, have a sufficient supply of the tools necessary for the construction of works, and often impromptu ones of wood have to be used.

A pestle for ramming earth is easily made, by taking four or five feet of the trunk of a tree eight to twelve inches in diameter, cutting the butt off square, and trimming the other end down for a handle.

Works to cover an advanced post, should be executed with the utmost celerity; advantage then should be taken of all inequalities in order that the least possible amount of earth may be removed. The detachment should be divided into two equal parts—one half working, whilst the other rests and watches. In fortifying the summit of an elevation, much less work will be required on the

hither than the farther side of the crest. Night should not interrupt the work.

Methods of Closing the Entrance of a Work.

103. Strictly speaking, an intrenchment is never closed; even those closed at the gorge, have an opening for getting in and out. This opening should be about a yard wide for the passage of footmen, and a yard and a half for horsemen; it is placed in the side opposite to the enemy, and defended in such a manner as to be no feebler there than elsewhere.

104. The entrance of a redoubt is advantageously closed by a traverse on the interior, of such a length that all shots fired from without, through the entrance, whatever may be their direction, shall strike the parapet of the traverse. The interval between the ditch of the traverse, if it has one, and the foot of the slope of the banquette of the side in which the entrance is, should be one yard. This gives a passage, right and left of the entrance, round the parapet.

If the ditch of the redoubt is continuous, a passage way of earth not having been left opposite the entrance, a moveable bridge may be made of two pieces of scantling and a few planks. This can be taken up and put down with great ease.

105. When time and means allow, a redoubt may be closed with a flèche in front of the entrance, leaving just room between it and the ditch of the redoubt to allow one man or one horse to pass. The flèche is better than the traverse, because the faces of the flèche are flanked by the redoubt, and cross fires are thus obtained.

106. For want of time to construct a traverse

or a *flèche*, the entrance may be barricaded with any thing at hand; an *abattis*, also, may be constructed, when there are trees convenient.

107. The entrance of a redoubt, or the gorge or any open work, may be closed by a "stockade work made with the rough trunks of trees, cut into lengths of twelve or fourteen feet, and averaging not less than ten to fifteen inches in diameter. They should be firmly planted, upright, in a narrow ditch three or four feet deep, either close together, with loopholes at suitable heights, or with intervals of a few inches for firing through. In either case, the interstices should be filled up to a certain distance with shorter pieces of timber to protect the men. The loopholes should be so high, that the enemy may not be able to use them, should he succeed in rushing up to the work.

A *banquette* or step will be required on the inside, whilst a ditch, and any other obstacle on the outside, that can be made in time, will add to the difficulties of an assault.

In defending a stockade, the means of stopping up any partial breaches made by artillery, should be at hand." Jebb.

Auxiliary Defences.

108. These are without number, but only a few will be specified. Barricades are formed of any thing at hand: stones, beams, planks, furniture; boxes, barrels, wagon bodies, bags, &c., filled with sand, rocks, manure, &c.; cotton bags, mattresses, hay, fodder, bags of wool, any thing and every thing.

In forming a barricade with these heterogeneous materials, take care to place and secure them in such a manner, that the enemy, having arrived at

the foot, can not displace them readily ; form a sort of plongée of the upper part in order to be able to see and fire over it ; make a banquette behind also, so as to be able to reach the plongée ; stop up all interstices with earth, dung, stones, hay, fodder, cotton, wool, &c. A barricade should be high enough to prevent the enemy from firing upon the defenders, or scaling it easily, but not too high to prevent the fire of the defenders from being nearly horizontal. Its length should be such as to close completely the street, road, or other way which it blocks up and protects.

109. An *abattis* is composed of trees cut and thrown down towards the enemy, the limbs sharpened, interlaced, and secured by stout pickets. The trunks should not be cut entirely through, but remain fastened to the stumps ; the stumps being three feet high. In blocking up roads with *abattis*, or in woods, shrubberies and copses, the trees and brushwood may be cut down in every direction, so as to encumber the ground as much as possible. When numerous they need not be disposed in any regular form.

110. "Palisades form an excellent obstruction, and are made thus :

Dig a trench 2 feet 6 inches deep, and as many wide ; nail the ends of the palisades to a piece of timber or a small tree at the bottom of it ; then fill in with earth and ram well.

The palisades should be 9 or 10 feet long, so that when finished they may project about 7 feet towards the enemy. They should be made of young trees about 8 inches in diameter, but stout rails will answer.

When weak, a cross piece must be nailed near the top to prevent them from being broken off.

They should not be so close together as to protect the enemy when he reaches them." Jebb.

Obstructions of every kind should be multiplied, in order that the enemy, when advancing to assault, may be detained as long as possible under fire. By this means, his ranks are thinned and his men exhausted.

Houses.

111. "To defend a house, barricade the lower doors and windows—knocking all the glass out the latter;—cut loopholes through the walls $4\frac{1}{2}$ feet above the floors; place a *tambour*, or *stockade redan* before the doors; partly barricade the windows of upper story, and make loopholes as down stairs.

Tear off the roof, if not fire proof, and cover upper floor with earth or dung 2 feet deep.

If the house is to be defended to the last extremity, tear down the stairs, and use ladders for communicating between lower and upper stories; cut holes through upper floor to fire down; place balconies in a defensive state.

All out buildings, fences, woods, and shrubberies, not to be employed in the defence, must be leveled to the ground." Mahan and Jebb.

Villages.

112. "Being charged with the defence of a village, reconnoitre the environs thoroughly, to ascertain the obstacles to, and the facilities for, an approach of the enemy. The former must be increased, the latter destroyed. Slight accidents of ground improved by shallow trenches, speedily put troops under shelter.

When the surface is undulating, it should be particularly examined with this view; take position at different points and direct men to approach, stooping occasionally to see how much they will be masked from a fire at different heights above the surface. The hither side of a ridge is the best to get speedy cover, but the ground should be swept from crest to foot.

Next, examine houses, walls, hedges, &c., and turn to account or destroy. In arranging the plan of the works, draw every possible advantage from all obstacles, natural and artificial, rendering certain points inaccessible, procuring shelter for the troops, and flanking arrangements by means of walls, hedges, &c. Should there be danger of an attack before the works can be completed, break up the roads leading to the village, and guard all accessible points with cannon. Barricade the streets of the village, and place the houses and walls near the barricades in a defensive position. In taking these preparatory measures against a sudden attack, use any means that will afford protection against the enemy's fire—bales of cotton or wool, casks of earth, piles of lumber, &c. These various measures will demand the greatest activity on the part of the troops, and care should be taken to employ the men at work with which they are conversant.

Place the works so far from the village, that the troops will not be incommoded by splinters from them, or the smoke and flames, should they be set on fire.

Arrange the communications between the exterior defences and the central rallying point, so as to prevent confusion, and check the pursuit of the enemy. The garrison should be perfectly familiar with them, and the resources they afford. Make short cuts through walls, houses, hedges, &c.; and

erect barricades at all points suitable for a stand." Mahan.

Rogniat's Line.

113. "Works covering extended positions and presenting but one front, are called Lines. They are *continuous*, or *with intervals*."

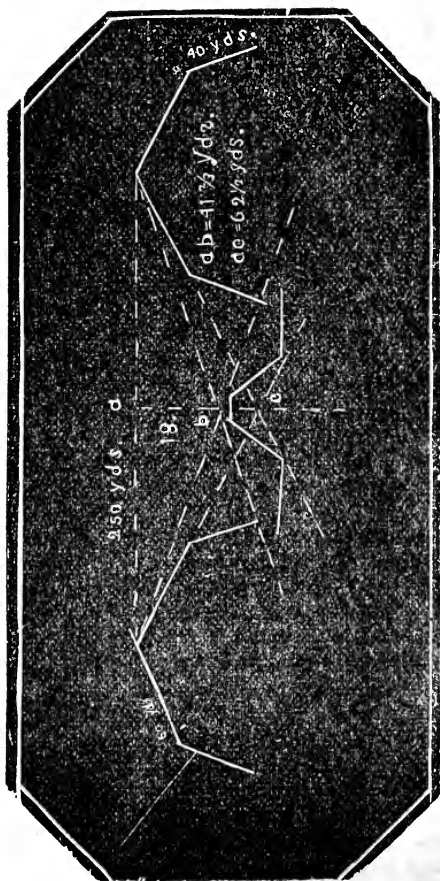
Owing to their great extent, their relief is slight, and the simplest angular figures are adopted for their plan. Every advantage should be taken of the natural obstacles, so as to diminish the labor of constructing artificial ones. The flanks should rest on impracticable ground, or be protected by strong field forts.

Continuous lines are not suited for an active defence; they are, however, an admirable defence for new troops, on account of the confidence they inspire. They serve also to guard against surprise, and to prevent predatory excursions of small attachments of the enemy.

They consist of *flèches*, *lunettes*, *redans*, or *bastions* connected by straight curtains, or broken lines.

Lines with intervals usually consist of two lines of detached works; those of the second being placed opposite the intervals of the first. The detached works are usually *lunettes* or square redoubts. Lines with intervals are peculiarly adapted to well disciplined and active troops. The first shock of the enemy is partially thrown away against the first line. Should he attempt to pass through its intervals, he would expose his flanks to a close and deadly fire. If the enemy is repulsed, the main body of the army, drawn up in rear of the works, immediately assumes the offensive, and charges him, relying upon the works to cover its retreat if driven back.

Gen. Rogniat's System of Defence is as follows,
fig. 18:



Points 250 yards apart are taken for the salients of the lunettes; their faces and flanks are placed in defensive relations; between them, a redan is placed to flank the faces without intercepting the fire of the flanks; a straight curtain is carried from the redan, and leaves an interval of 10 yards between it and the flanks of the lunettes for sorties.

The lunettes receive the minimum profile both for parapet and ditch; the redans are simple epaulements to cover cannon fired in barbette; (over the parapet;) and the curtains consist of a trench with the earth thrown forward to form a parapet so arranged as to allow the infantry to march out in line of battle.

The advantages claimed for this line are: the short time required to form the works—a night being sufficient for an army to intrench itself;—the lunettes form the first line, and contain only infantry; the artillery being placed in the redans where it is more secure, protects the lunettes and draws the fire of the enemy from them; the curtains are defended by infantry, who can sally from them at a moment's warning, and, aided by the cavalry and light artillery débouching through the intervals, attack the enemy in flank. To secure the flanks, Gen. R. proposes to throw up a strong square redoubt at each extremity of the line, and to place a heavy battery between it and the adjacent lunette." Mahan.

¶ The following remarks on Lines are from Brabazon:

"The battle of Pultowa was fought in 1709. The position selected by the Czar extended from the Borysthènes to its tributary the Vorskla, and his front; which was covered by seven large redoubts, mounted with heavy cannon, faced the junction of these rivers; so that the Swedish army,

in the event of defeat, would be driven and cooped up into the acute angle thus formed in its rear.

Charles, with his usual intrepidity, advanced to the attack, and succeeded in carrying two of the redoubts, which were, however, recovered by the Russians after a determined struggle. It was in vain that Charles attempted to penetrate between the intervals; a terrible fire mowed down his troops, who recoiled in disorder from the attack. The Czar, following up his advantage, led his first line beyond the works, and pressing on the discomfited Swedes, converted their retreat into a rout.

* * * * *

Although the Russian troops displayed the greatest gallantry on this occasion, yet their success has been generally attributed to the fore-sight of Peter, in covering their front with detached works, which, without impeding their movements, served to check the first fiery onslaught of the Swedes, which, like the '*Furia Francese*' in the Italian wars, had so often proved fatal to their enemies. Before this time it was the custom of timid generals—and they were many—to bury themselves, like moles, under vast and continuous lines of intrenchments, which, however, were rarely found to afford the expected security. Marlborough made little use of such works, and his invariable success against those of the enemy, together with that of Eugene at Turin, seemed to point out the weakness of this method of defence, resting on unbroken lines, which, involving a vast amount of labor in construction, and requiring to be manned by very considerable forces, were equally strong at all points, because really so at none. The strictest vigilance of the defenders, distributed over an immense extent of ground, could rarely guard against a well concerted surprise; while one single attack, if successful at

once, exposed the whole line of defence to be turned and taken in reverse. Far superior, then, to such a system, was that of detached works, first developed by Peter on the field of Pultowa. His redoubts, skilfully constructed, supported one another and the whole line, and far from cramping—as did continuous lines—the movements of the troops which they were intended to shelter, they rather facilitated them by affording so many pivots and flank defences, and equally covering their advance or retreat. His principles, always highly esteemed, were never more so than in our day. They are the principles of Torres Vedras, of Paris, of Sebastopol; principles, in fine, which have always been attended with success, and which in future it will be dangerous to neglect. * * * *

Napoleon and Saxe considered redoubts the best description of field works.”

Batteries.

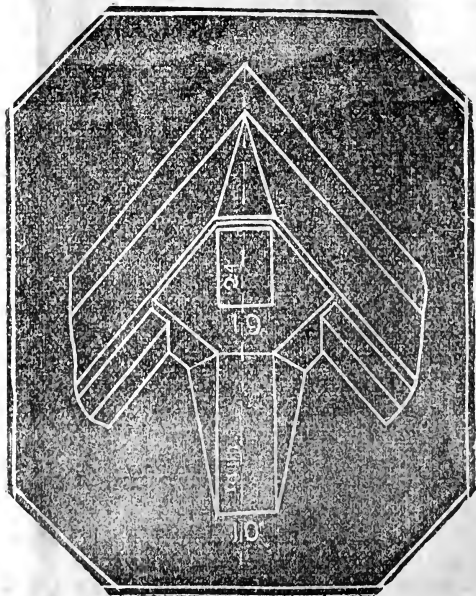
114. Battery usually means a collection of guns; in fortification, it also means the arrangements made for firing over or through a parapet. A *barbette* battery, is one that fires over the parapet; an *embrasure* battery, is one that fires through openings in the parapet, called embrasures.

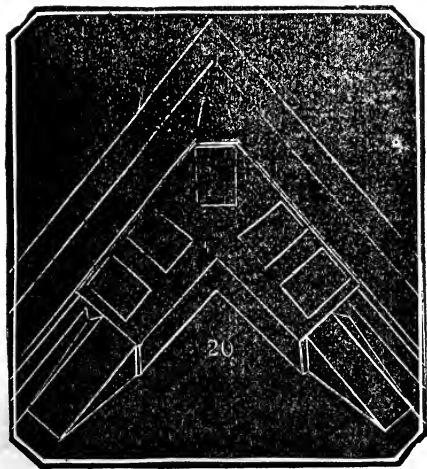
The flanks and salients are the best positions for batteries, because from them the salients are best protected and the ground swept. At these points batteries of several pieces should be collected; for experience has shown that an efficient check can be given to an enemy's columns only by a heavy and well sustained fire.

The *barbette* is a construction to allow a piece to fire over a parapet. It consists of a mound of earth thrown up against the interior slope; the top is

level, 2 feet 9 inches below the interior crest for light guns, and 4 feet for heavy; if behind a face, the width along the magistral is 15 to 18 feet, the length, 24 feet. The earth at the rear and sides receives its natural slope. The barbette is ascended by a ramp, or inclined plane of earth, 10 feet wide, with a base of 6 times the altitude. The earth at the sides has the natural slope. The ramp is placed at some convenient point in the rear, so as to take up as little room as possible.

A barbette in the salient to allow a gun to fire in the direction of the capital, is constructed thus, fig. 19:





level, θ
 light g
 the wi
 length,
 receive
 by a r
 with a
 sides h
 some c
 as littl

A b
 in the
 fig. 19



A *pan coupé* of 11 feet is first made; from the foot of the interior slope at the *pan coupé*, set off a distance of 24 feet on the capital; at this point erect a perpendicular to the capital 5 feet long on each side; from the extremities of this perpendicular draw lines at right angles to the adjacent faces; the hexagonal figure obtained is the surface of a barbette for one gun. The ramp is along the capital.

If 3 or more guns are placed in the salient, a *pan coupé* is made as before; 24 feet are in like manner set off on the capital; but instead of proceeding as in the last case, a perpendicular is drawn from this point to each face, and the pentagonal space formed, is taken for the gun in the salient; from the perpendiculars last set off, as many times $16\frac{1}{2}$ feet will be taken on the magistral of each face as there are guns required: this will give the width of the barbette on each face; the length will be 24 feet, and the two will be united in the salient. One or more ramps will be made as most convenient.

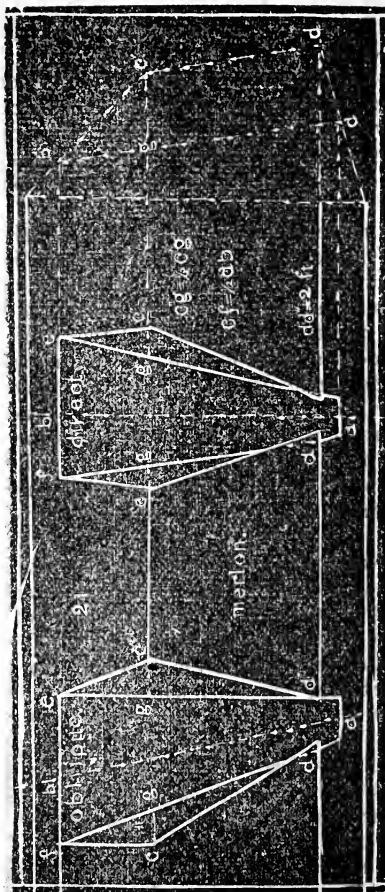
Fig. 20.

The advantages of the barbette consist in the commanding position given to the guns, and the wide field of their fire; on these accounts, the salients are the best positions for them. Their defects are, that they expose the guns and men to the enemy's artillery and sharp shooters.

Light pieces, particularly howitzers, are the best for arming barbettes; because the hollow projectiles of the latter are very formidable, both to the enemy's columns and his cavalry; and when his batteries are opened against the salients, the light pieces can be readily withdrawn.

The embrasure, fig. 21, is an opening made in the parapet for a gun to fire through.

The bottom of the embrasure, or the *sole*, is 2



feet 9 inches or 4 feet, according to size of gun, above the ground on which the wheels rest; it slopes outward to allow the gun to be fired under an inclination;—the base of this slope should never be less than 6 times its altitude; the interior opening or mouth is 18 inches to 2 feet wide, according to calibre of gun, and rectangular; the embrasure widens towards the exterior, which widening is called the *splay*; the exterior line of the sole is equal to half the distance between the interior and exterior lines of the sole. The line bisecting the sole is the *directrix*; the *cheeks*, or sides of the embrasure, are laid out by setting off two points on the exterior crest of the parapet, one on the right and the other on the left of the sole, so that the horizontal distance between them and the sole, shall be equal to one third of their height above it. Lines are then drawn on the exterior slope from these points to the exterior points of the sole; in the same manner, on the superior slope lines are drawn from those points to the upper points of the mouth on the interior crest. These 4 lines form the boundaries of the two cheeks on the exterior and superior slopes. When the directrix is perpendicular to the direction of the parapet, the embrasure is *direct*; when not perpendicular, the embrasure is *oblique*. Oblique embrasures are laid out in the same manner as direct. The mouth increases in width with the obliquity; the exterior line of the sole, is one half the directrix.

The muzzle of a gun should enter the embrasure about 6 inches, to prevent the blast from injuring the cheeks; this limits the obliquity of the directrix to about 60 degrees for long guns.

The height of the cheeks should not be more than 4 feet for the same reason. The mass of earth between two embrasures, is called a merlon.

The advantages of embrasures are, that men and guns are better protected than in barbettes; but they have a limited field of fire, weaken the parapet, and present openings through which assailants might enter. Owing to their limited field of fire, they are chiefly used to protect particular points—as a ditch, a salient, a road;—the flanks are the best positions for them.

Guns should rest on platforms, for the ground is soon worn into ruts under them. The platform is rectangular, 9 to 10 feet wide, 15 to 17 long, consisting of three pieces of scantling 6 inches square, and 2 inch plank.

Between the platform and the parapet a piece of scantling is placed, projecting about 6 inches above the platform, to prevent the wheels from running against the revetment and to give the gun its proper direction at night; it is called a *heurter*.

The earth under a platform should be well rammed and the sleepers imbedded in it.

A platform may be made of 3 pieces of scantling; one under each wheel and one under the trail.

Bomb Proofs.

115. A good bomb covering for embrasure batteries can be obtained thus:

Make a flat roof, of convenient height, and sufficient length and width, of two or three layers of large logs, and then add 4 to 8 feet of earth well rammed. The logs of alternate layers should lie the same way. The sides can be protected by walls of logs.

For magazines:—Sink a pit 10 feet wide, 16 long and 6 deep; cover with one or two layers of logs 12 inches in diameter, and throw over them

the earth taken from the pit to the depth of 8 feet. The entrance is dug at one end.

Observation.

116. The construction of revetments, bastion forts, batteries and all complex works, should be under the supervision of a professional engineer or artilleryman; but all infantry and cavalry officers should have sufficient elementary information on the subject, to enable them to provide for the safety and protection of their men when on detached service.

Intrenched Camps.

116'. Vauban proposed intrenched camps as a means of strengthening fortified places; Saxe protested against fortifying towns and cities altogether, on account of the great sufferings to which non-combatants, as invalids, women, and children, must necessarily be exposed during sieges; Louis Philippe, following the inspiration of Napoleon and others, fortified the heights around Paris, but at such a distance from it, that the citizens must ever be exempt from the horrors of blockades and bombardments.

Nature, said Saxe, is stronger than art; select, therefore, such points, other than towns and cities, where the natural obstacles are greatest, and strengthen them by earth works, using masonry only when absolutely necessary.

But, to carry out Saxe's humane proposition, would be to abandon all towns and cities to the ravages of the enemy, and to give up to him all the vast stores of every kind which naturally accumulate there. Moreover, it would tend to draw a

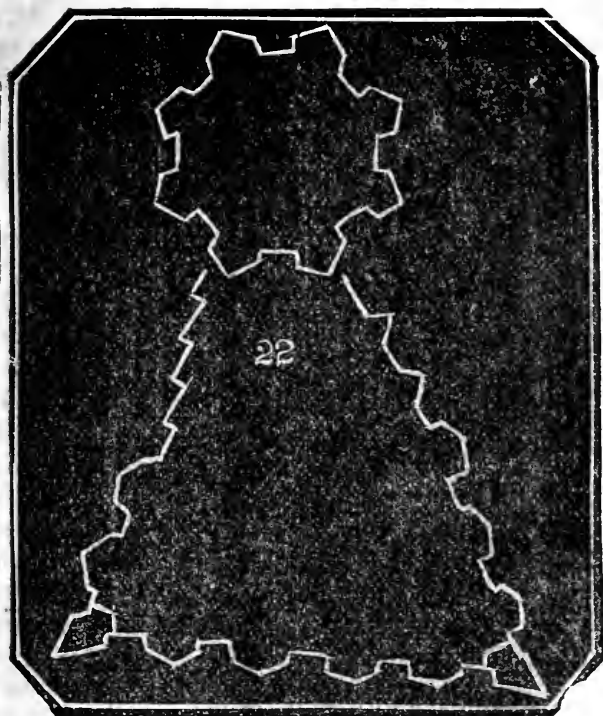
line of demarcation between the civilian and the soldier, the ultimate result of which would be, to isolate the citizen completely, and to make him, perhaps, a mere spectator of a game of chess, and utterly indifferent as to the issue.

Louis Phillipe fortified Paris in such a manner as to accomplish the objects of both Vauban and Saxe, viz:—to give to the city the support of an army intrenched, and to exempt the inhabitants from all the horrors of a siege.

Intrenched camps, are not, as a general rule, constructed until war has been declared, and only at such places favorable for resisting an invasion or to prevent the capture of an important town. However, the more important works for the defence of a capital, arsenal or navy yard, especially if they are to be of masonry, should be constructed before hand, and an accurate plan of all the others necessary to complete the defence, be kept constantly on hand. Every advantage, in locating and erecting the works, must be drawn from the ground, in order to diminish as well their number as their extent and relief. As it would be impossible to *defile* an intrenched camp, it should be so located as not to be dominated by adjacent heights. The bastion trace is the best, though the broken line and the line of redans may also be employed with advantage, especially on adjacent lines forming reëntering angles. Fig. 22 gives Vauban's idea of an intrenched camp. It is connected with the fortified town, or fortress, and consists, as much as possible, of continuous works along long lines, so as to diminish the points of attack.

The parapet is 9 feet high, and 18 feet thick; the ditch, 15 feet deep; the whole surrounded by a good *glacis*; the salients *fraised* or *palisaded*.

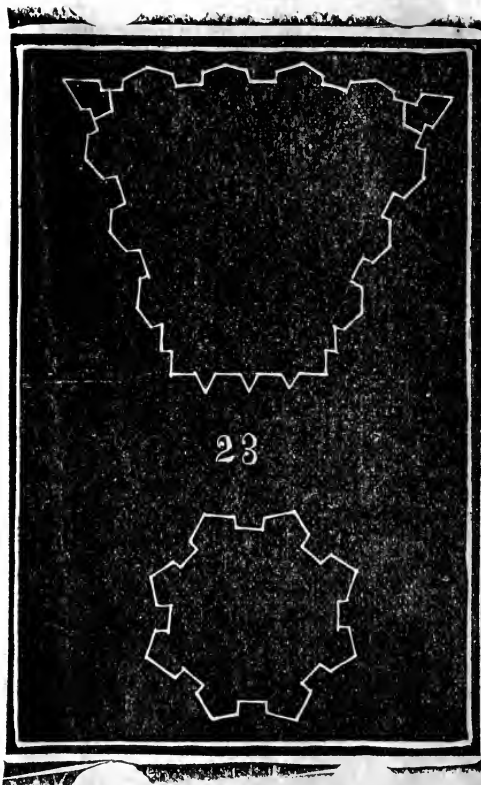
[A *fraise* consists of stakes, trunks and branches



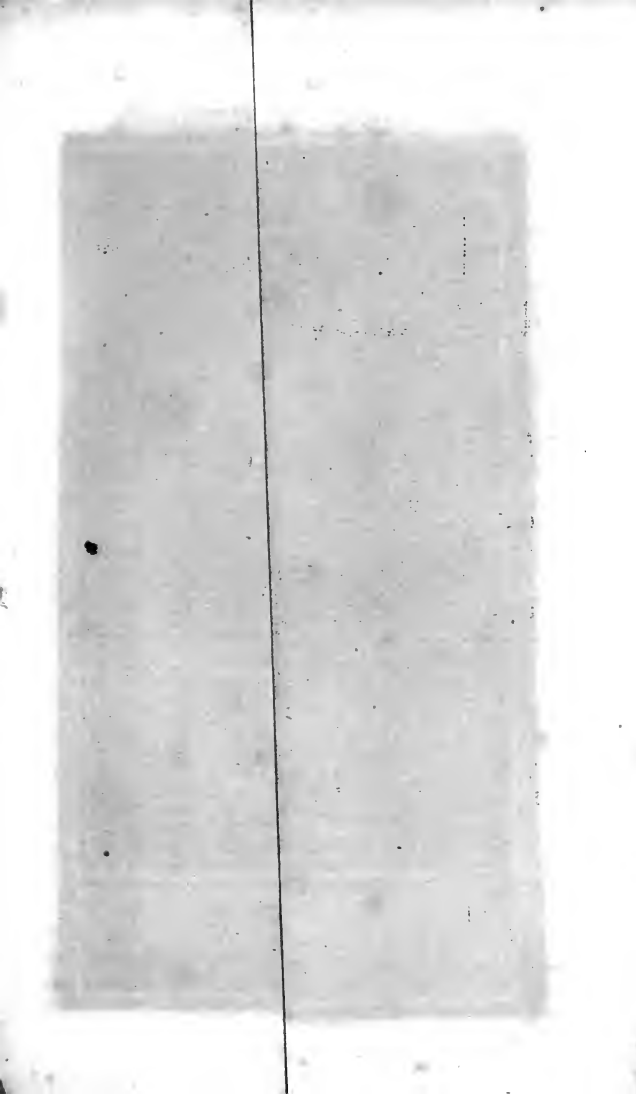
of trees projecting from the berm over the ditch, to prevent an escalade.]

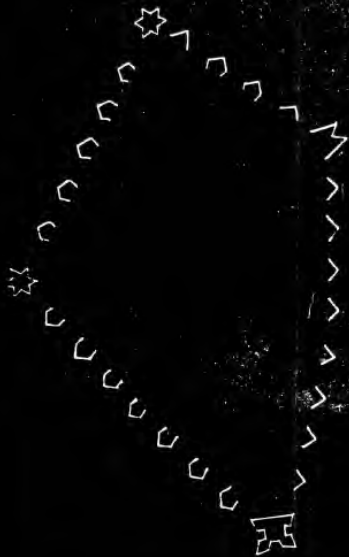
Fig. 23 gives the plan of an intrenched camp separated from the fortified town, the interval being such as to be easily swept by the fire from both town and camp.

By this arrangement, the circumvallation or simple blockade of the place, becomes much more difficult, because the place and camp occupy so much more room; moreover, being separate from each other, the capture of one does not necessitate that



of the other, and the besieged, being masters of the communication, can send assistance from one to the other at will.





24

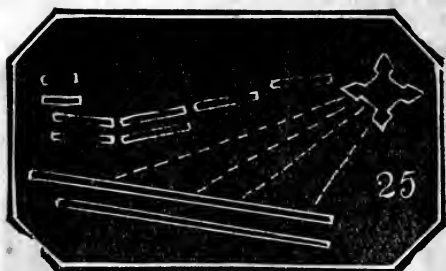


Fig. 24 gives the plan of an intrenched camp, the lines not being continuous. The angles of the polygon are occupied by small but strong forts, heavily armed, and the right lines joining them by *flèches*, *redans*, *lunettes* or *redoubts*, as the configuration of the ground may require.

Lines with intervals are more favorable for offensive defence than continuous lines ; and, when protected by heavy, and especially well drilled troops, are to be preferred. In such a camp, that of Buntzelwitz under the cannon of Schweidnitz, the Great Frederick with an army of 40,000 men bade defiance to the allies with three fold forces. His camp was traced and constructed in four or five days.

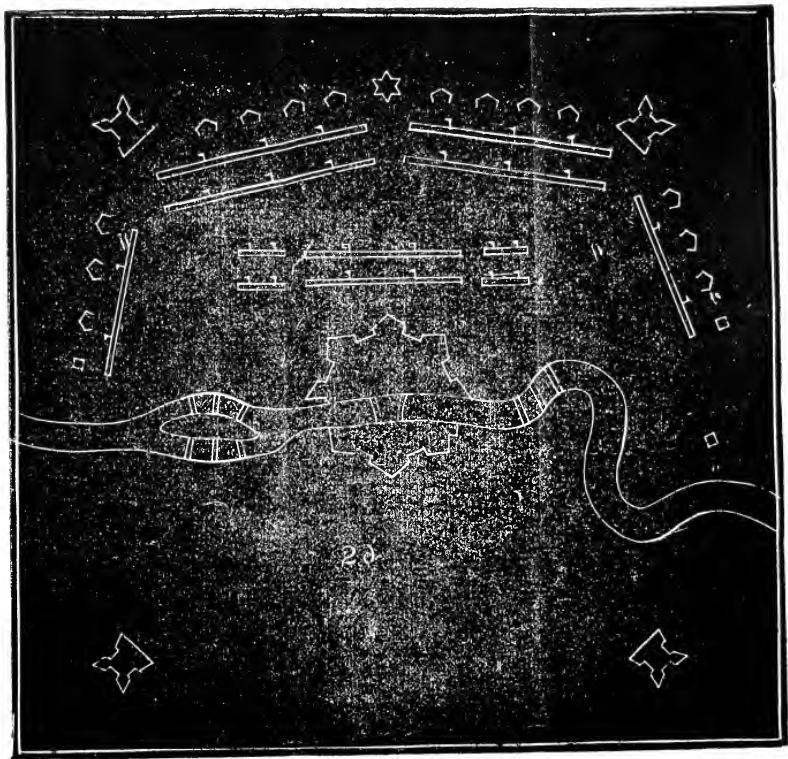
Fig. 25 shows to what extent one wing of an army, supported by a strong fort, may be weakened with safety. [See Note.] Pivoting on such a fort, all the cavalry and artillery may be withdrawn from the wing thus supported in order to strengthen the other, and enable it to make an overwhelming attack upon the enemy, if the wing advanced is sufficiently strong to take the offensive.

The wing thus advanced, however, is always subject to one great danger, that of being out-flanked, and attacked in front and reverse. If, therefore, the wing thus advanced is not protected by strong natural obstacles, field-works will have to be erected. But a change of direction on the part of the enemy, will require a corresponding one on the part of the defensive army, the abandonment of the works first constructed, and the erection of new ones for the protection of the wing exposed. It is desirable, then, to have in the vicinity of fortresses and important towns, points of support to favor the manœuvres of a defensive army, and between which it can change front without danger, in order



to face the enemy from whatever direction he may come.

Gen. Rogniat resolves the problem thus: Establish four small but strong forts around the place to be defended; it being in the centre of the large square thus formed. [Fig. 26.] These forts closed on all sides, should be placed on the most advantageous heights, about 2,500 to 3,500 yards from the place, and 6,000 to 8,000 yards from each other. The space between any two forts would form a field of battle capable of receiving an army of 50,000 to 100,000 men, and might be regarded as impregnable; the forts armed with heavy cannon, would support the wings perfectly, and the line could be strengthened at intervals by field works thrown up as occasion might require. These four forts circumscribing the place to be defended, would with it form a vast intrenched camp, presenting four fronts or four different fields of battle; so that from whatever side the enemy might come, the defensive army could face him. The ordinary guard of such a camp would be reduced to that of the four forts, or not more than 800 men, and perhaps 200 or 400 at the place itself in order



senting four fronts or four different fields of battle; so that from whatever side the enemy might come, the defensive army could face him. The ordinary guard of such a camp would be reduced to that of the four forts, or not more than 800 men, and perhaps 200 or 400 at the place itself in order

to protect the supplies accumulated there for the support and reorganization of armies.

It is easy to vary the arrangement of the fortifications, so as to adapt them to the location, and to profit by all the advantages which nature offers. If the town is on a river, as often happens, there should be numerous communications between the banks above and below, so that several columns may cross from one to the other at the same time.

If the country is flat, then on each bank there should be two forts so as to command the river, and the other two thrown forward so as to form the summits of two triangles having the river for a common base. Rivers, however, are usually accompanied by heights more or less distant, upon which the forts must necessarily be constructed.

The range of projectiles is now so great, that for the better protection of an important town, it would be well to surround it by five or six forts so as to increase their distance from the town, and at the same time leave a field of battle between any two contiguous ones. Troops that allow themselves to be cooped up in towns, are invariably despised by the citizens.

The advantages of these intrenched camps are many and great; they cannot be left behind by the enemy, because his communications and supplies would thereby be endangered; nor can he mask them by an inferior force; nor attack them without greatly superior forces. When he does attack them, he will have to do so by regular approaches, which, on account of the extended lines of the besieged, will be subjected to all the disadvantages of a concentrated fire from numerous batteries. The power of concentrating a heavy fire from numerous dispersed works, has hitherto been the prerogative of the besiegers; henceforth, the new

system of defence offers it in a great measure to the besieged also. Moreover, being unable to entirely invest the besieged, they can receive reinforcements and supplies almost at will, and withdraw in comparative ease and safety whenever the position may become untenable. Last, but not least, the town thus defended will be nearly always exempt from the horrors of bombardment and famine.

The defence of Sebastopol partaking more, perhaps, of the character of an intrenched camp than a fortified town, shows what wonders determined forces protected by simple earth works, can accomplish. The works for the defence of Sebastopol were, unfortunately, too near the town; consequently it was reduced to a ruin before the besiegers got possession of it.

During the war of the Revolution, the land defences of Charleston and Savannah were too near the towns; let them now be defended by works of a greater circumference. Jackson's defence of New Orleans in 1815, shows that he, even at that time, understood the importance of meeting the enemy in a fortified position at a distance from the place to be protected.

The general application of these principles to the defence of our more important cities, as Richmond, Charleston, &c., is evident; their modification and special application to any particular place, will, of course, depend upon an intelligent study of the topography of the environs.

NOTE.—The classical scholar is referred to Caesar's African War, (Chapters XLI, XLII and L,) for two early instances of this order of battle.

In the first instance Scipio, having the fortified town of Uzita in his center, offered Cæsar battle, which Cæsar declined; in the second, Cæsar, having strengthened his right wing by defensive works, formed a triple line of battle on his left, sent all his cavalry thither, and offered Scipio battle, which Scipio declined.

CHAPTER IV.

Partisan Warfare.

GENERAL DIRECTIONS.

117. *Do to the enemy as much injury as possible, and avoid receiving any from him.*

Never exhibit a rash valor without necessity; it is always prejudicial to the success of enterprises. True valor exhibits itself on the proper occasion to decide an affair; temerity is foolish, and rarely succeeds.

Men being the soul of war, their preservation should be the principal object of their chief. As he should know when to sacrifice them to gain a triumph, so he should avoid engaging them for negative results.

Never fire except when certain of hitting: this saves ammunition and preserves the arms in good condition for a critical moment; for one never knows at the commencement of an engagement, how or when it will end. Shots fired at a distance destroy ammunition and do little or no compensating damage to the enemy. Troops of all nations commit the fault of making much noise without necessity and without effect.

Troops that advance without firing at a distance, disconcert their adversaries and nearly always make them fly, without experiencing much loss themselves, and keep their arms and ammunition in good order.

Before the enemy, watch at night, and sleep in the day when possible; it is the only way to avoid or defeat surprises.

To be on the look out, is dictated by reason and prudence ; security before the enemy, has often been severely punished. Trust to no one the secret of projected operations ; the least indiscretion may cause the best conceived and best managed enterprise to fail.

Cantonments.

118. If the cantonment is before the enemy, the entire detachment should be assembled in the same place, as a church, grange, &c., the men keeping on a part of their clothing the whole time, especially their breeches ; the horses, if the force is of cavalry, should be kept at hand, one half remaining saddled and bridled, so as to be ready to repulse an attack.

If the enemy is at some distance, the men are billeted by twos and fours in the houses nearest the place of assembling.

In both cases, a police guard with a drummer or trumpeter, should be posted, and advanced posts placed on the communications by which the enemy might débouche ; these posts furnish one or two sentinels. During the day, the posts may be called in, and a watch placed on an eminence or high building, to give notice of the approach of the enemy. This, however, can be done only in an open country.

The chief of a detachment should see that persons and property are protected ; take measures with the local authorities for securing subsistence for his troops, and make the distributions regularly and legally. In an enemy's country, he should magazine provisions and forage procured by requisition or otherwise, and have the cattle and sheep parked. Above all things, he should remem-

ber that order is the only means to maintain himself for a long time with limited resources, whilst pillage inevitably prepares cruel privations for the future.

Before the enemy, he should himself reconnoitre to a great distance all the roads and especially those leading to his cantonment, destroying most of them for some distance with coupures, barricades and abattis, to avoid placing posts on them; but he should have them watched by flying sentinels or vedettes. If he has received orders to hold the place to the last extremity, he should loop-hole the most solid and best situated houses, so as to gain cross fires upon the point or passage to be defended, and collect every thing necessary to construct barricades in the promptest manner.

We speak here only of small detachments cantoned in villages and hamlets, and of small parties of the enemy that may be out reconnoitering, foraging, marauding, &c.; for from the moment that these points become of any great military importance, they will be occupied, defended and attacked with means not at the command of the chief of a small detachment. The capture and recapture of a village located on an important communication, has often been the occasion of fierce and bloody combats. The chief of a detachment should have all the artisans necessary for maintaining it in good condition, and the transportation necessary for a precipitate departure, and for procuring and sending off provisions.

Grand Guards, Picket Posts, Sentinels and Vedettes.

119. Grand Guards having to furnish the picket posts placed upon the communications in front, as

well as the patrols necessary to explore the country, should be placed where the communications commence to radiate, and at 1,200 or 1,500 yards in advance of the main body, on a main route, at the fork of several roads, in a field enclosed with walls, ditches, or hedges, at the edge of a forest, the head of a bridge, or under some shelter that will conceal them from the sight of the enemy.

The small or picket posts are placed at the forks of the roads, 400 or 500 yards in advance of the grand guards, behind some house, bank of earth, wall, hedge, or ridge.

The sentinels or vedetets are placed 100 or 150 yards in front of their posts, along the roads, paths and other communications that lead to them, and under the shelter of some object that will conceal them from the sight of the enemy, but will, nevertheless, allow them to look all around; they should not be placed too near any covered ground which the enemy might slip up to, and surprise them.

The chief of a picket post should conform strictly to the instructions given him by the chief of the grand guard.

As soon as the chief of one of these advanced posts has arrived at the place assigned him, he should thoroughly reconnoitre its environs, the routes, roads, paths and other communications leading to it, the ravines, sinks, quarries, walls, hedges, &c., by which the enemy might approach; also the roads, paths, &c., leading to the grand-guard, so that he may readily rejoin it in case of attack; this done, he should examine the arms and ammunition, and have the former loaded in his presence.

An advance post before the enemy, should keep itself concealed, remain silent, without fire, change its position frequently, and announce the approach of the enemy by the proper signals.

When a post changes its position, it should be done at night, in silence, without noise, and with celerity, to prevent the enemy from observing the movement.

Advanced posts being in general too feeble to reconnoitre or force a position, should not waste time in skirmishing, and thus expose themselves to be taken; but, having reconnoitred the enemy, should fall back upon the grand guard, by the roads and paths indicated in advance. However, there are cases, when protected on their flanks and numbering 30 men or more, they are ordered to maintain their posts at all hazards. They should then intrench themselves as well as possible, behind a coupure, an epaulement, a barricade, or an abattis, according to locality.

The chief of an advanced post should sleep only during the day, remaining awake during the entire night, and keeping always half of his men on the watch. They, however, should be relieved every 3 or 4 hours. Every evening, he should inspect the arms and ammunition, see that the men place them where they will not be injured by moisture, and can be readily seized in case of an alarm; and that the men take off no part of their equipments and clothing.

An hour before day he should have all his men under arms, and send a corporal and 3 or 4 men to examine the ground several hundred yards in advance of the sentinels, to discover any attempt of the enemy at a surprise. He will omit sending out his patrol when the grand guard attends to this duty.

A sentinel or vedette should always be ready to fire, holding his musket, carbine or pistol ready for that purpose. He should avoid giving unnecessary alarm, and only fire when he sees the enemy dis-

tinctly. Even when resistance on his part is useless, he must fire; and if surprised, seized and unable to fire, he should cry out, to give the alarm. The safety of the post, and that of the troops encamped or bivouacked in the rear, may depend upon it.

If a sentinel's post is so far that he can not be heard, two should be stationed there, in order that one may come to bear any intelligence, whilst the other stays and watches. During the day, the approach of the enemy may be announced by signs previously agreed upon—as a handkerchief, or other object, held up in a particular manner. At night, sentinels are placed in low places rather than on heights, in order that they may distinguish against the sky objects moving about. They should always be posted behind some object, (in order that they may observe without being seen,) and their position changed every night. They should know the road and the way through fields and woods to rejoin their posts in case of an approach of the enemy.

To prevent sentinels and vedettes from being surprised, signals may advantageously precede the challenge or the countersign. If they precede the challenge, the sentinel gives the first—the challenged party answers, and the sentinel says, "Advance, and give the countersign." If they do not precede the challenge, the sentinel says, "Halt;" the challenged party halts, and gives the first signal; the sentinel answers, and says, "Advance, and give the countersign." When challenging, the sentinel must always make ready to fire. If the challenged party refuses to halt, when ordered to do so twice, or if he gives the wrong signal or countersign, or several advance upon the sentinel at the same time, he must fire and hasten to his post.

Persons on horseback should be required to dismount, before advancing to give the countersign.

When an advanced post is not strong enough to furnish sentinels to guard all the avenues, flying sentinels should be sent out, to go from one to the other and examine all the covers of every kind between them, in which an enemy might conceal himself.

At night, sentinels should frequently place their ears to the ground and listen for the approach of men and horses; the silence of the night frequently allows them to be heard at a great distance.

When a noise is heard in the direction of any sentinel, the chief of the post, with a guard, immediately goes to ascertain the cause of it.

Cavalry posts and patrols are usually some distance in front of the infantry. They observe the same precautions as the others.

The following method of posting grand-guards, &c., has its advocates, and is perhaps the best:

Divide the belt of country in front of the army, and for a considerable distance on each flank, into a series of out-posts, and to each assign a battalion of sufficient strength to furnish the requisite number of advanced posts and yet have a good reserve left. This battalion should be drawn from a single regiment, and not be composed of detachments from several. The reason is obvious—the men and officers all know each other.

The accompanying diagram will explain more clearly than words, the disposition of the sentinels, the advanced or picket posts, &c.

(1.) is the chain of sentinels placed at suitable distances apart. (2.) the line of picket posts, consisting each of a non-commissioned officer, and 3 to 6 privates. (2.) is 100 yards or so, in rear of (1.) (3.) is the line of picket post reverses, each

it examined in front and on flank by small parties consisting of 3 or more men: he gives them clear and precise instructions what to do in case they meet the enemy on the march or in ambuscade—what signals to give to indicate where they are, and to stop the march of the grand guard.

These scouting parties should consist of at least 2 men, so that if one is captured or killed, the other may give the alarm by firing and rejoining the advanced guard. Whatever may be the number of scouts, not more than one half should be employed to examine any suspicious ground, &c.; the other half remaining at some distance and watching: for, if all should enter any forest, house, hamlet, or village, they might all be seized by the enemy, and no one would then remain to give the alarm to the advanced guard. On reaching a hamlet or village, the scouts examine the houses and enclosures one by one; those who remain watching, keep on the alert, and each one takes care not to lose sight of his companion. Those who enter, question the inhabitants on the march of the enemy, his strength and kind of troops; they should, also, closely watch the changes of countenance of the inhabitants; observe whether the horses, oxen, wagons, &c., are in their accustomed places, &c. When, in examining a hamlet or village, the scouts are sufficiently numerous, a chain of them should be thrown around it, to prevent the escape of any one in the direction of the enemy, should he be in the environs.

When two scouts wish to examine a house, one enters, the other holding himself near at hand and on the alert; if, at the end of several minutes, the latter does not see his comrade, he calls him, and if he does not answer, he hastens to inform the advanced guard, or makes the proper signal if the

enemy is in sight: if, however, his comrade reappears, they go on and examine each house, enclosure, &c., in the same manner.

When a wood or ravine is to be examined, the scouts keep at a good distance from each other; the most advanced, examine all the accidents of the ground before them, whilst the others keep a good look out in every direction.

If a scout discovers an ambuscade, and is at the same time seen himself by the enemy, he fires and hastens to the advanced guard; if he is surprised and seized, so as to be able neither to fire nor cry out, his comrade, not seeing him reappear, will hasten to inform the advanced guard.

The scouts should observe every thing and in every direction—clouds of dust and their direction—the barking of dogs in a general and extraordinary manner—the flight of birds from any single direction—the tracks of men and horses in the dust and mud—all indicating the presence of bodies of troops. Flat and open grounds should not be neglected, because the shallowest ditch or ravine, bushes and growing crops 2 feet high, or even less, may conceal a detachment in ambuscade, lying flat upon the ground, and waiting for the moment to act.

When the scouts on the flanks find roads or paths leading to the route followed by the detachment, they examine them for some distance, to see that the enemy cannot suddenly débouche from them, and attack the flanks of the column; they frequently climb trees to reconnoitre the ground for a long distance around; they question all the inhabitants they meet, and retain those who appear suspicious, or who attempt to escape in the direction of the enemy.

On meeting the enemy, when wishing to indicate

their position, or to notify the advanced guard to halt, or march on, they make the proper signal.

The safety of the detachment depending upon the activity of the scouts, and the vigilance of the chief of the advanced guard, the latter marches with the utmost circumspection; studies the progress and signals of the scouts; keeps silence in ranks; does not permit his men to scatter, go into houses to eat or drink, or into fields, orchards, and vineyards, to gather fruit; he takes advantage of localities where there is nothing to fear, such as heights and open fields, to relieve his scouts by others less fatigued.

If the country is unknown, and the forks of the roads numerous, he takes a guide at each hamlet or village, whom he obliges to go with him, and at each branch of the road, he leaves a soldier to inform the commander of the column of the route taken, or leaves some sign previously agreed upon, to direct him.

On meeting the enemy, he assembles the advanced guard, and sends an intelligent man to the rear, to give information of it. He then reconnoitres the enemy, and, if he finds he has to do with superior forces, he falls back slowly, without skirmishing, to rejoin the column. If pursued by the enemy, and attacked, he divides his men into two equal parts, places one-half in one rank on each side of the road, so as to offer less mark to the enemy, and continues his retreat, stopping only when his men can deliver an effectual volley, at short distance, from some good shelter. If he discovers that he cannot join the column before being attacked by the enemy's cavalry, he will unite his men, throw out skirmishers, and endeavor to reach the flanks or rear of the column by cutting across the fields.

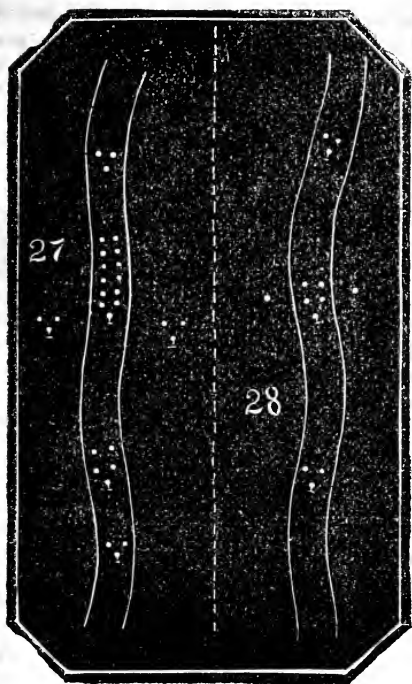
If the country is so level and open that the cavalry can pursue him, he will form his men in a cir-

cle around him, and resist the attack as best he can, taking advantage of every opportunity to place his men in a favorable position—on an eminence, across a ditch, under trees, &c.—and to continue his retreat.

The march of every army, isolated column, or detachment, should be protected by a cloud of scouts and skirmishers, so arranged as to envelop it completely; and this cordon should be so far from the main body, and be, at the same time, so connected with it, by means of supports, patrols, &c., that it may always receive timely notice of all movements of the enemy within striking distance. The dispositions of an advanced guard, when feeling for the enemy, and of a rear-guard, when retiring before him, may be conceived from the diagram for out-post duty. Under the circumstances mentioned, advanced and rear guards should consist of troops of all arms, but the proportion of light cavalry should be considerable—so considerable, indeed, that the country, for a considerable distance in front, and on both flanks, may be completely inundated by this class of active and most efficient troops. A great superiority in this class of troops often decides a campaign.

Figures 27 and 28 show the march of advanced patrols of fifteen and thirty men respectively:

30 15



Escorts.

121. The chief of a detachment charged with escorting a convoy in an enemy's country, will make the following dispositions:

Before commencing the march, he will inspect the arms and have them loaded in his presence, and divide his detachment into four parts: one-fourth for

an advanced guard, one-fourth for a rear guard, one-fourth on each side of the convoy.

If the road is sufficiently wide, he will arrange the wagons in two or three ranks, and the pack horses in 5 or 6. The advanced guard will march 400 yards in front; the rear guard, the same distance behind.

The advanced guard will throw out scouts, and take all the precautions described in the preceding section. If a defile, or any covered and dangerous ground presents itself, the convoy will be halted until it has been minutely examined by the scouts, and the signal "All safe" made, when it will resume the march.

The convoy should never be halted upon covered and broken ground; the teams should never be taken from the wagons, nor the pack horses unloaded, except at "grand halts," and they should be near water. At "grand halts," the wagons or packs are formed into a square, so that, in case of attack, they may be used as a sort of breast work or barricade, in resisting the attack. Some skirmishers will be placed in front at some distance, who will inform the convoy at the first signal. As soon as the enemy makes his appearance, the skirmishers will open fire, and endeavor to delay him as much as possible; during this time, the teams will be hitched to the wagons and the pack horses loaded; and the convoy will then advance or retreat, according to circumstances, protected by its skirmishers and escort. If the enemy is too strong for the advance or retreat to be continued, the convoy will be halted on some strong position and parked. The skirmishers will not enter the square until the last moment; they should even be reinforced or relieved, for it is important to keep the enemy at a distance from the convoy as long as possible.

If, being in that position, and having exhausted the greater part of his ammunition, the chief discovers that he can resist no longer, he will kill the horses, set fire to the wagons and packs; and, all having been destroyed, form his men in close column, and open a way through the enemy at the point of the bayonet.

All that has just been said, will apply to the escort of a general officer or a bearer of dispatches; if the escort is attacked, it will form in square or circle around the officers, and continue the march in advance or in retreat, as the case may be—halting and charging the enemy, whenever necessary.

If it is impossible to resist, and there is no chance of safety, the dispatches must be destroyed before surrendering.

There are two methods of parking wagons: 1°, by placing them so, that the tongues will be perpendicular to the side of the square, and either within it or without; 2°, by placing them so that the tongues will be parallel to the side of the square. The latter is the best, gives opportunity for a larger square, and better protects the men and horses. Intervals between adjacent wagons, sufficiently wide for one man to pass, must occasionally be left.

Ambuscades.

122. Conceding ordinary intelligence and caution to the enemy, it is easily seen that it is a difficult matter to post an ambuscade so that it cannot be discovered, and that it may have the desired success. The problem to solve is this: post an ambuscade so that the enemy can neither discover it, nor escape it when he has once fallen into the snare, and at the same time, secure a retreat in case he is succored by a strong reinforcement.

The proper places for posting an ambuscade are—the foot of hills, defiles formed by forests, isolated houses, hamlets, villages, encloseures, thick hedges, sinks, ravines, forks of roads, fields covered with growing crops of sufficient height, &c., &c.

An ambuscading party is always divided into three parts: 1°, the head, or advanced guard, to cut off the enemy's advance when he has fallen into the snare; 2°, the centre, or main body, to attack the enemy on both flanks at the same time; 3°, the tail, or rear-guard, to cut off his retreat. The head and tail may consist each of one-sixth of the detachment, the centre being composed of the remaining two-thirds. Secrecy being the soul of all military enterprises, he who has command of an ambuscade should make known his intentions and dispositions only when he has arrived upon the ground. There he gives to each chief of division his instructions—which should relate to the manner of concealing his men—regard being had to the localities—to the signal of attack by the centre, the coöperation of the head and tail, and finally to the reunion of the detachment and the retreat, in case of failure.

Ambuscades should be placed as near as possible to the road which the enemy is to follow; but if the enemy's troops are veterans and well skilled in war, it will be best to post them farther off, but still sufficiently near to be able to take position on the road after his scouts have passed and before his main body has come up. To do this, the ground must be thoroughly studied, and some woods or ridges should be placed between the detachment and the road, to conceal its position from the enemy. Some men should be sent up trees to observe every thing, and give notice, by means of proper signals, of the movements of the enemy.

Ambuscades should, if possible, be posted in such

a manner that the enemy must have marched a long time and be fatigued before arriving at them; for tired and worn-out troops become careless and are more easily surprised.

The detachment destined for an ambuscade, should reach its position the night before, and arrive at it by a road perpendicular or opposite to that by which the enemy should come, and post sentinels and vedettes in such a manner as to prevent any one from going towards the enemy.

If the ground to be passed over is such as to retain the foot-prints of the troops, they should march in single file, and, if infantry, be instructed to step in the tracks of those in front, so as to present the appearance that only a few men have gone along the route.

An ambuscade is sometimes successfully concealed by sending a small detachment a little in advance of it, with instructions to skirmish, but to assume the appearance of being surprised and in alarm, and to retreat over ground nearly uncovered. Under these circumstances, the enemy sometimes forgets his safety by indulging in a hot pursuit of a few men, who seem easy to take, and thus fall in the trap. This ruse is old, but still always new; and it but rarely fails to succeed.

If there are roads and paths on the flank of the ambuscade, that is to say, leading to it, they should be destroyed for some distance by coupures or abatis, in order that the enemy may not escape by them, but only insure his destruction by entering them.

Should the centre succeed in getting quite near the enemy without being perceived, a gun will be fired as the signal of attack; each will then promptly single out his man and fire; the head and tail will throw themselves on the road and hasten to-

wards the enemy ; in the meantime, the centre, still concealed, will load, and approaching nearer, fire again. It is important that the assailants should take advantage of the trees, hedges, &c., and fire upon the enemy without exposing themselves ; otherwise the enemy might retaliate, and the affair might thus become equal.

If the enemy has horses, they should be killed or wounded in order to dismount the men, and stop the wagons if any.

When success has crowned an ambuscade, the chief should assemble his men, disarm the prisoners, take possession of the supplies captured—transporting them by the aid of the captured horses, or by those taken from the inhabitants, and return as rapidly as possible to the main body or position from which he set out.

If the enemy should receive an unexpected reinforcement, the detachment must hasten to the place of assembly indicated beforehand, and then retreat in good order, carrying off all the prisoners and as much as possible of the supplies captured.

Should the chief discover resistance to be useless, he will send off the prisoners under a sufficient escort, destroy the supplies captured, and fall back skirmishing.

When dispatches have been seized, they must be sent off immediately by some trusty officer, and thus avoid the risk of having them recaptured by the enemy.

When a convoy is to be attacked, spare horses, ready harnessed, must be taken along to supply the places of those killed in the wagons. If the ambuscade is successful, all stores captured that can not be transported, must be destroyed.

Patrols.

123. Patrols before the enemy are an excellent means of maintaining the vigilance of the advanced posts, sentinels and vedettes, and for instructing young officers; they are furnished by the grand guards, and have to discharge duties similar to those of advanced guards in an enemy's country, as far as scouting and examining the ground are concerned; but with this difference, that patrols are sent out only at night, and instead of constantly following any communication whatever, they scour the entire country for 500 yards or so, in front of the advanced posts and sentinels.

Officers called to command these patrols should reconnoitre during the day the country to be passed over in the night, in order that they may not get lost and fall into the enemy's hands. The patrol should be strong enough to send out scouts to the front and on both flanks, the main body waiting, in silence and under arms, their return. Cavalry patrols should be careful not to take along horses addicted to neighing.

In all cases, the patrol should frequently stop and remain in absolute silence—some listening, with ear to the ground, for footsteps of man or horse, and endeavoring, if any are heard, to ascertain their strength and the direction of their march.

If two patrols meet, for it is well to send them out in different directions so that they may cross each other, they can readily make themselves known by the proper signals and challenges. If a party of the enemy is met, one half of the patrol will fire, and then all will hasten to the grand guard, for patrols are not intended to fight the enemy, but merely to learn his position. All sentinels hearing the alarm, will return to their posts.

The chief of the patrol will send a messenger at full speed to inform the nearest advanced post and grand guard, and the latter will, in the same manner, notify the main body.

The advanced post united to the patrol, will await the enemy in order to reconnoitre him, and, deploying as skirmishers, will delay his advance as much as possible in order to give the grand guard and principal body time to assemble and make their dispositions to receive him. Troops camped or bivouacked before the enemy, should take arms an hour before day, and not break ranks until after the return of special patrols sent to the front some time before day, to examine the ground in front of the sentinels and vedettes, in order to discover whether or not the enemy has made any arrangements for a sudden attack about day light.

Organized Marauds.

124. It often happens during war, that large districts are entirely deserted by their inhabitants at the approach of an invading army; this extreme measure, counseled by fear or by the forces defending the district, deprives the army of its resources for subsistence, because the inhabitants conceal or destroy all that they cannot carry off with them. The expedition to Portugal, in 1810, suffered much from this measure, which was not only advised but enforced by the English army.

Now, to subsist the army, if it is not followed by long provision trains, and it is impossible to have them in sufficient numbers for a large army for any length of time, recourse has to be had to marauding parties; they are regularly organized, and sent out to scour the country and gather up every thing that will do to sustain life in man or beast.

Before setting out, the chief should supply himself with a sufficient number of wagons and teams, or pack horses, and in his march will conform to all that has been prescribed for the conduct of the escort of a convoy, as well as what follows.

Arriving near a wood or forest, the chief halts the convoy, parks it, and sends half of his men to surround the wood, whilst others are sent in to examine it. These searches frequently discover not only horses and cattle concealed in the woods, but men placed there to guard them, and who can make known other places where cattle and provisions are secreted. Reaching a village, hamlet or town, the convoy is halted again; the advanced guard enters and examines it carefully as a precaution against ambuscades. When the place has been thoroughly examined, and is pronounced clear of the enemy, the detachment enters and takes military possession of it. (See Cantonments.) The chief divides his command into parties of 8 or 10, placing a sergeant or corporal in charge of each, and sends them out to gather every thing that can be found. These small parties examine the houses from top to bottom,—sounding the walls to find concealed doors of closets, &c.,—the out-houses, walls, hedges, wells, gardens, &c., &c. Places under houses, in yards or gardens, where the earth has been lately moved, should be carefully examined.

The supplies found are carried to some place selected for the purpose, deposited on the ground, and the pack horses and wagons are immediately loaded; for it is important not to waste a moment of time, but to get back to the main body as soon as possible. The chief should see that his men do not load themselves with booty to the exclusion of the provisions sought for.

The army in Portugal supported itself in this

way from the 1st of October, 1810, to the beginning of March, 1811. Each corps had to send out marauding parties. Many of these were cut off by the inhabitants, the Portugese and English troops, as well as all men who wandered off singly or in small numbers.

Foraging Parties.

125. Detachments going out to gather green forage consist of those who are to gather the forage and load the wagons, and those who are to protect the operation.

The troops for the protection of the foragers proper, should reach the indicated place by day break, and in advance of the wagons; they immediately seize and guard all the avenues by which the enemy might débouche—small posts are established on the roads; sentinels, vedettes and patrols thrown out. The main body then occupies some central position, known to all the small posts, the wagons are stationed on the road leading to the camp, and the operations begin. The foragers cut the grass, clover, green oats, wheat, corn, &c., as the case may be, load one wagon at a time, and start it immediately off; then another, and so on. In this way, should the enemy make his appearance, a part of the forage may be saved, whilst all may be lost by waiting for the entire convoy to start off together. At the first signal, all the unloaded wagons leave for the camp.

The sentinels and vedettes are so placed as to be able to see to a great distance, and to communicate promptly with each other, their posts and the main body by means of signs previously agreed upon. A suitable signal announces the approach of the enemy. As soon as heard or seen, the forages pre-

pare to depart; the sentinels and vedettes join their posts; these hasten to the main body at the indicated place, and the chief immediately makes his arrangements to resist the enemy and protect the convoy; which in the mean time files rapidly to the rear. One third to one-half of his force, is thrown out as skirmishers, who, protecting themselves as well as they can by all the accidents of the ground, endeavor to keep the enemy at a distance; in this manner he conducts the retreat, fighting the whole way and disputing every foot of ground, until the convoy has got sufficiently far to the rear to be safe. The skirmishers may then be called in, and the retreat conducted more rapidly, but still in order, and with every precaution to resist an attack, or to make one, according to circumstances.

If the convoy has to pass through a defile in its retreat, the escort will maintain its ground until the entire convoy has entered, and not enter itself until all the skirmishers have been rallied; if, however, the flanks of the defile are not inaccessible, the skirmishers will hold them instead of entering the defile, and will join the escort at the exit. The remainder of the escort will enter the defile, and fire by platoon or company in retreat, if closely pressed; or will deploy as skirmishers, if the enemy has artillery, and retire by ranks.

Dry forage is collected in the same manner and with the same precautions, as green. Detachments for this purpose are usually sent to farm houses, hamlets and villages. If few or no inhabitants are met, the party acts as if on a maraud.

The escort of a foraging party acts as an advanced guard in going, and as a rear guard on the return. Every precaution should be taken to guard against a surprise or an ambuscade; and, if

there is any danger of a flank attack, going or returning, the escort should take all the precautions already detailed.

Roads, Bridges and Fords.

126. In selecting the emplacement of a post, care should be taken so to locate it, that the enemy's front must be contracted as he approaches it; that it shall not be commanded by neighboring heights; and that it shall offer the greatest number of natural means of defence.

If placed upon a road or causeway with impracticable flanks, obstruct the passage with coupures, abattis, &c., as a cover for the men.

When the emplacement is determined by any cause whatever, the natural defences must be strengthened by a redoubt if the position can be turned; and, in any other case, by a flèche or lunette, loopholed walls and houses if sufficiently near, barricades, abattis, palisades, &c.

The defence of a bridge depends upon the localities: if the river is fordable, a redoubt should be thrown up at the most suitable place for disputing the passage, and for protecting the defenders from the enemy's skirmishers; if not fordable, a flèche or other work be thrown up in front of the bridge, houses near the bridge be placed in a state of defence, and the passage of the bridge obstructed by barricades. When a flèche or other work is thrown up in front of the bridge, all auxiliary means of defence must be adopted to obstruct the advance of the enemy, as coupures, abattis, palisades, &c.

If the bank next the enemy commands the other, the bridge cannot be defended, and should be destroyed—if of stone, by blowing up some of the middle arches; if of wood, by cutting several of

the spans, or burning it; some times, it is sufficient merely to remove the flooring of a wooden bridge. All materials on the side of the enemy for mending the bridge, all boats, flats and other means of crossing the river, should be destroyed or removed.

Skirmishers should be placed along the bank to prevent the enemy's swimmers from secretly crossing the river to get the boats that have been taken from his side.

Materials for rebuilding the bridge should be concealed or destroyed, if the position has to be abandoned. A ford may be defended in the same manner as a bridge, if the enemy's side is open and flat; but if much broken and especially if it commands the other, the ford should be destroyed by deepening it, or sinking and securing the trunks of trees—their branches sharpened—in it.

Even when destroyed in this manner, a ford should be watched by a small post.

If the river is very crooked, forming numerous sharp elbows, fords may be formed above or below the one known, by cutting ditches across some of the narrowest elbows. To prevent this, or to be informed of it, small patrols should scour the bank of the river night and day.

Surprises.

127. The capture of an advanced post and its sentinels or vedettes, is a common occurrence in war, and one that frequently has important results; these *coups de main* are entrusted to intelligent and enterprising officers in charge of small detachments of infantry.

The officer charged with a mission of this kind, should study the ground to be passed over, learn,

as well as possible, the habitual emplacement of the post and its sentinels or vedettes, and gather all possible information from every source.

The most suitable time for the attack, is from midnight to 2 o'clock in the morning in summer, and from 4 to 6 in the morning, in winter; because men are then the most inclined to sleep. The men should be armed with muskets, bayonets fixed, and carry their cartridges in their pockets, or in a handkerchief tied around the waist—all the rest of their equipments being left behind to avoid the noise they make.

Four men are directed against each sentinel or vedette, by twos; they crawl towards his right and left, taking care to place themselves under the wind; those who have the most distance to go over, start first, and all proceed with the utmost caution, avoiding all noise, and endeavoring to enclose the sentinel or vedette in a circle which goes on contracting until it is impossible for him to escape.

If the sentinel is aroused by a slight noise, and challenges, they must all rush upon him; if two of them succeed in getting quite near to him, they leap upon him without waiting for the others, and endeavor to prevent him from firing, or crying out.

The sentinels and vedettes having been captured without giving the alarm, the post is easily surprised, especially in winter; for then, the men sit or lie around the fire, more mindful of present comfort than security from the enemy. The detachment, divided into three parts, advances slowly and silently, surrounds the post, and suddenly bursts upon it in such a manner as to prevent the men from seizing their arms, or escaping.

All who resist, at the capture of a sentinel, vedette or post, should be immediately put to death

with the bayonet, to avoid giving the alarm by firing.

To foil the vigilance of the enemy, the detachment should frequently halt, listen with ear to the ground, and if a patrol is heard, it must be avoided if possible ; for if attacked, the sentinels or vedettes would hear the noise, and give the alarm.

Roads, paths, bridges, and fords should be avoided, the detachment going through woods and fields ; there are few obstacles that brave, determined and active men can not overcome.

The means detailed for surprising an advanced post, show what measures should be taken by the post to avoid it.

A sentinel or vedette should never hesitate to sacrifice his life by alarming the post ; for the safety not only of the post and army, but of the nation, may depend upon it. On the other hand, the least resistance or noise by sentinel, vedette or post, is a sufficient justification for the attacking party to put him or them to death. A brave soldier knows his duty, and should discharge it regardless of consequences. Thus, only, can immortality be gained.

Attack of Posts.

128. To attack a post with any chance of success, the environs should be carefully reconnoitred, and all possible information gained by spies or from the inhabitants ; this information should relate to the number and kind of troops that defend it—the arms and other munitions—the nature of the emplacement and the form of the works—the manner in which the duties of the post are discharged—the character and energy of the commanding officer—whether it can be promptly succored, or is abandoned to itself.

A post may be carried by surprise, assault or ruse.

Surprises have been explained.

Attacks by assault should be kept secret until the moment of execution; the commanding officer alone should know the point of real attack, and the moment. His detachment is divided into two or three parts, one being charged with the real attack. The others make false attacks, with a great deal of noise, in order to draw the attention of the enemy to them. The party charged with the real attack, observes the utmost silence, does not fire, and is preceded by a few men with shovels, picks, axes, crow-bars, &c., for clearing away obstructions; others carry fascines, bales of hay, &c., for filling up the ditch, planks for crossing it, or ladders, if it is deep, for getting down the counterscarp, and up the scarp and parapet.

The post should be turned if possible, and if the flanks are defended only by natural obstacles, they ought to be very great if bold, active, strong and intelligent footmen can not overcome them.

Military authors, ancient and modern, differ as to the hour of attack; some advise the night, because darkness tends more to alarm the assailed than to bewilder the assailants; others, the break of day, without being able to give any good reason, except that the garrison of the post may neglect its duty; Vauban, in open day, after having alarmed the garrison for several nights in succession. But attacks have succeeded and failed at all hours. More depends upon the officers pitted against each, and the character of the troops they command, than upon any thing else.

As a false attack may become a real one, should circumstances favor it, the parties charged with making false attacks should receive the necessary

instruction on that point, and be provided with the means requisite. When attacks by assault are well conceived, kept secret, and conducted with vigor, promptness and *ensemble*, it is rare that they fail.

However, it is very difficult to foresee all that may retard or prevent the capture of a post; the means of defence are generally as varied as those of attack.

The capture of a post by *ruse* is a stroke of genius and intelligence on the part of him charged with it. No rules can be given other than what has already been said; all means are good, provided they succeed. "Success is the only criterion of merit." It is in vain to cite *ruses* already tried, for one rarely succeeds twice. However, a *ruse* once employed, may succeed again; success depending upon so many things that cannot be detailed, much less appreciated in theory.

Maxims of Napoleon.

129. The following maxims of Napoleon may not be inappropriate to this subject.

"The duty of an advanced guard (of an army) does not consist in advancing or retiring, but in manœuvring. It should be composed of light cavalry supported by a reserve of heavy, and by battalions of infantry, with artillery to support them. The advanced guard should be formed of choice troops, and the generals, officers and soldiers, according to the requirements of their respective ranks, should be thoroughly acquainted with the peculiar tactics necessary in this service. An untrained company would only be a source of embarrassment.

The first quality of a soldier is constancy in enduring fatigue and hardship. Courage is only

secondary. Poverty, privation and want, are the school of the good soldier.

To reconnoitre defiles and fords rapidly; to obtain guides that can be relied upon; to interrogate the clergyman and post-master; to establish speedily an understanding with the inhabitants; to send out spies; to seize the letters in the mails, translate and make an abstract of their contents; in short, to answer all the inquiries of the general-in-chief on his arrival with the whole army—such are the duties which come within the sphere of a good general of an advanced post.

Troops in the field should never lay down their arms and capitulate. No people can be safe, if officers are allowed to lay down their arms on the field of battle, by virtue of an agreement favorable to themselves and the troops under their command, but in opposition to the safety of the remainder of the army. To withdraw from peril themselves, and thus render the position of their comrades more dangerous, is manifestly an act of baseness. Such conduct ought to be proscribed, pronounced infamous, and punishable with death. The generals, officers and soldiers, who, in a battle, have saved their lives by capitulating, ought to be decimated. He who commands the arms to be surrendered, and they who obey him, are alike traitors and deserve capital punishment."

Troops that break ranks and fly, should also be decimated. As a mere question of personal, individual safety, it is always better to stand by one's colors than to abandon them ignominiously. Retreat, when necessary, should be conducted in an orderly manner, and in constant readiness to turn upon the foe.

"It would seem easy to convince brave soldiers, that death strikes more quickly and more surely

men flying in disorder than those who remain united to present a bold front to the enemy, or rally promptly if they happen to be momentarily forced. A system of rallying signals should be adopted in order to facilitate the reunion of troops scattered in consequence of a sudden terror, or an irresistible charge of the enemy. At no time are order and self-possession so important. Discipline leads to order; order produces concert; concert gives strength; but the severest discipline will some times fail to re-assemble broken troops, when a good system of signals will rally them promptly."

[Jomini.

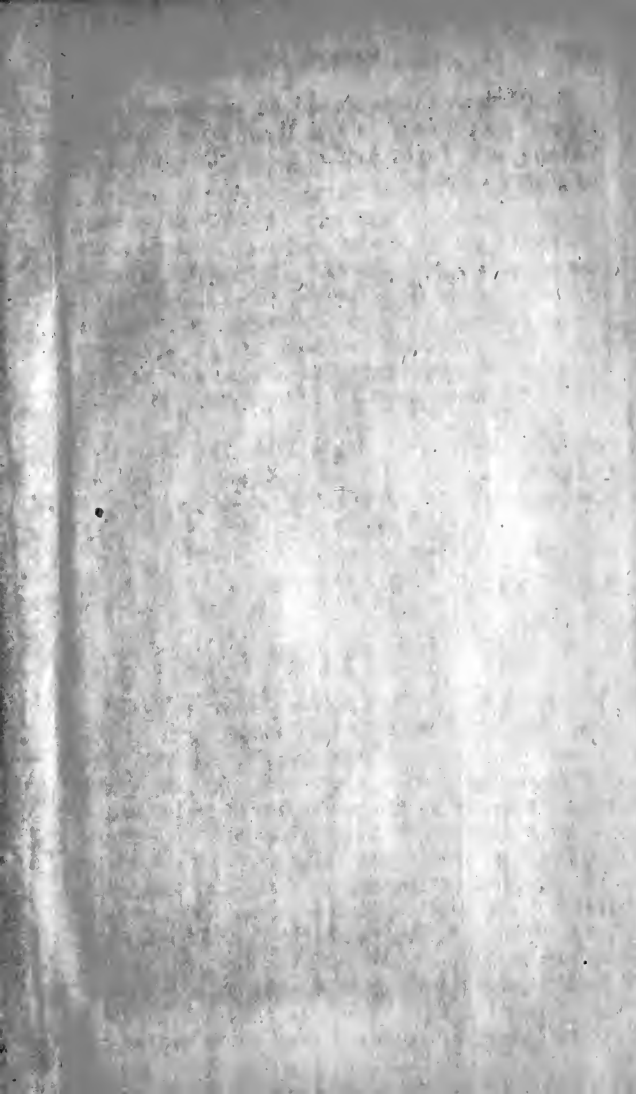
Let each individual soldier be impressed with the fact, that running not only disgraces his country, his colors and himself, but places his life completely at the mercy of the meanest foe.

Gulliver when asleep was bound by the Lilliputians; the strong man who gives way to his fears, may be slain with a bodkin by a child.

CONCLUSION.

130. Troops for out-post duty, advanced guards, escorts, &c., should be composed of picked men, bold, indefatigable, ardent, abounding in resources, enterprising, and good shots. They should, in the case of a large army, be organized into a separate and distinct Partisan Corps or Division, and be occupied the whole time in learning the arts and devices, and practising the acquirements which distinguish good partisan troops. Recruits for this corps should be obtained as much as possible from hunters, trappers and other classes learned in field and wood craft. Indians, if capable of being drilled, would make most excellent partisan troops. As scouts they would be in the highest degree valuable.

A Partisan Corps should be composed of the proper proportions of the three arms—Infantry, Cavalry, and Light Artillery—and be commanded by picked officers.



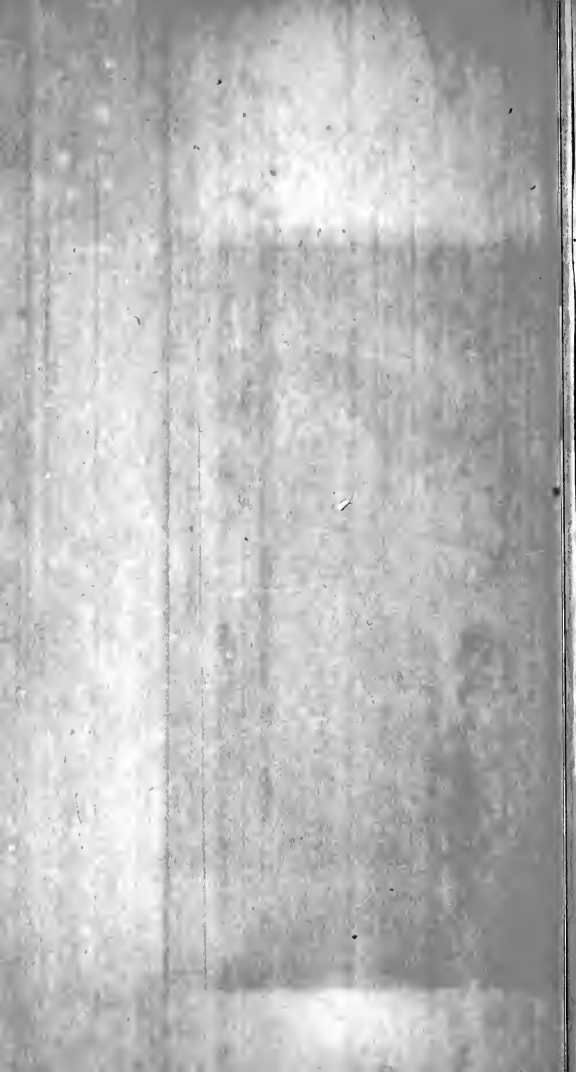
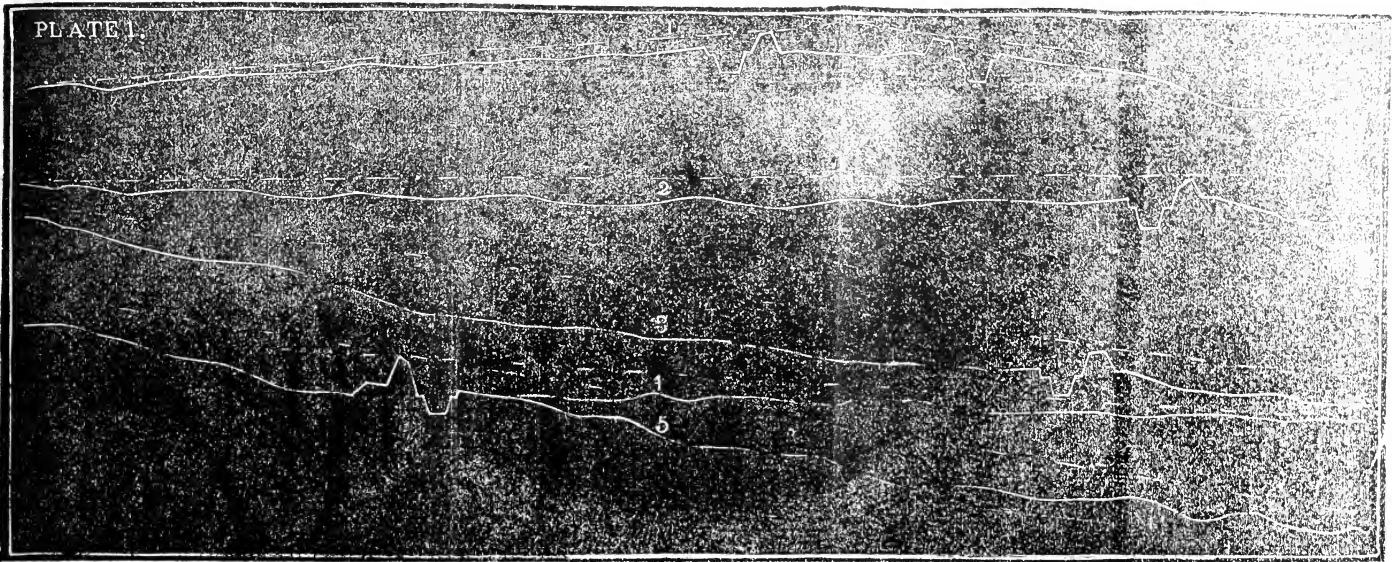


PLATE 1.



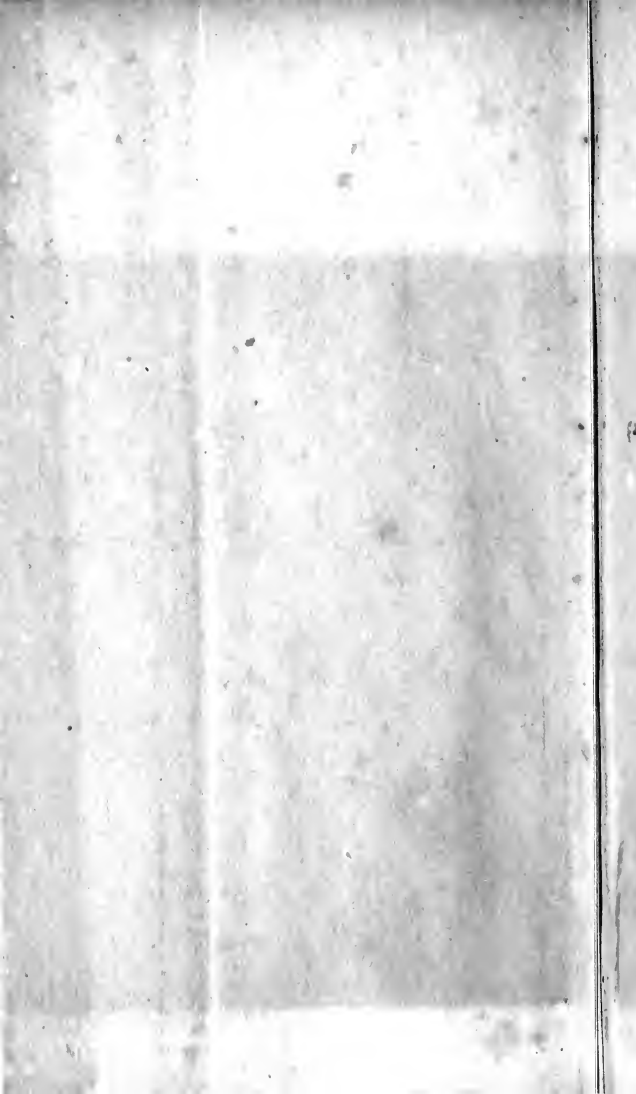
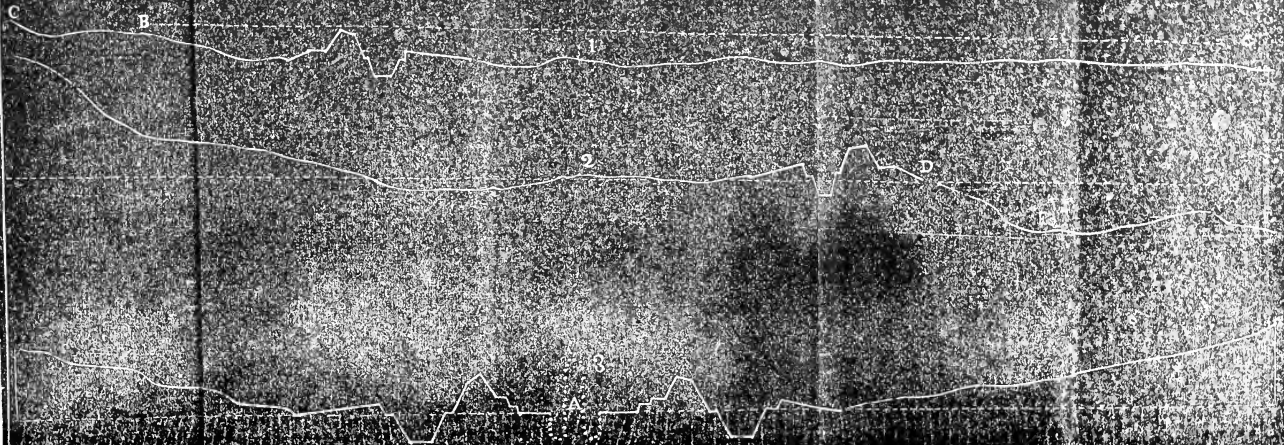


PLATE 2.



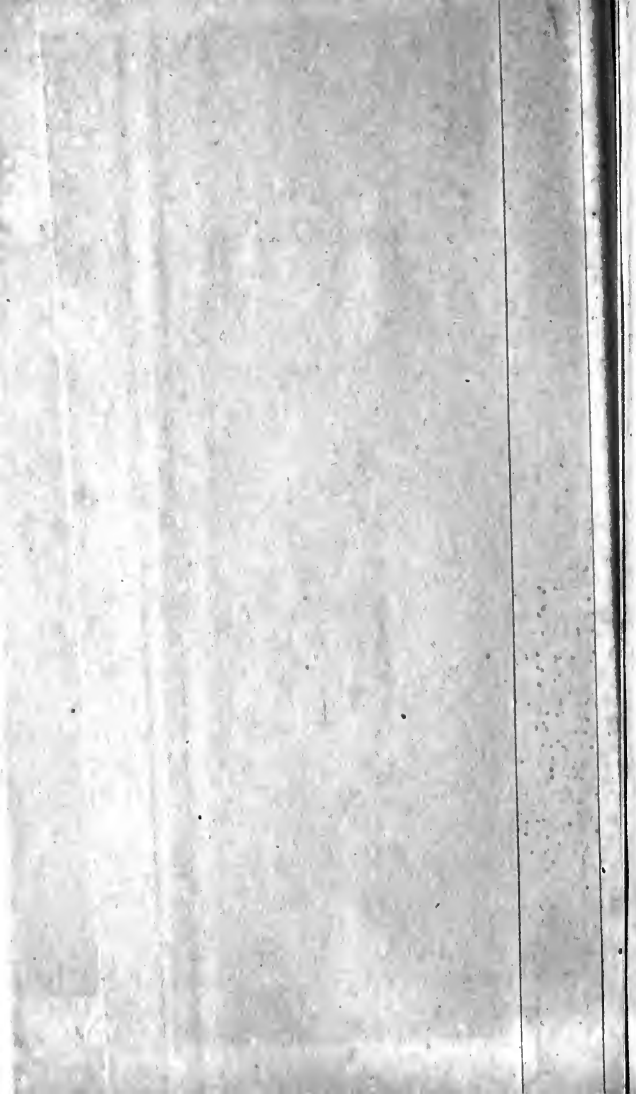
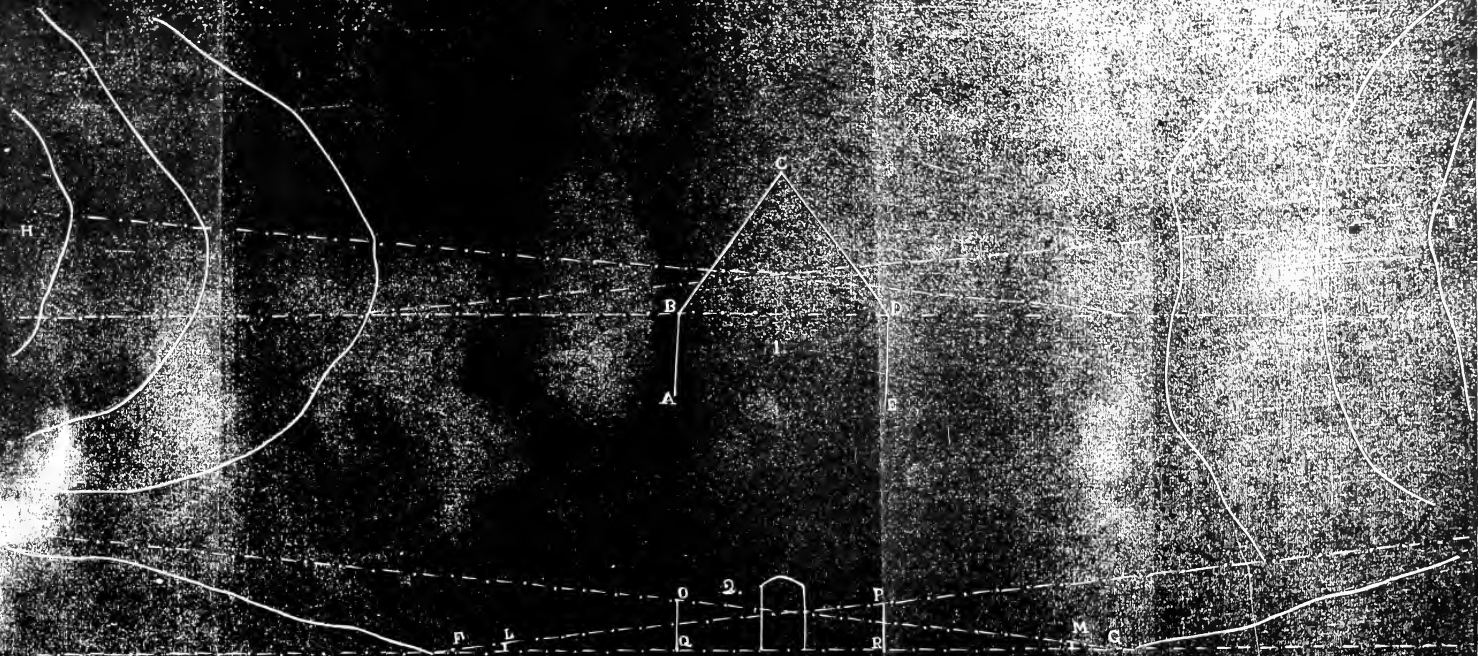
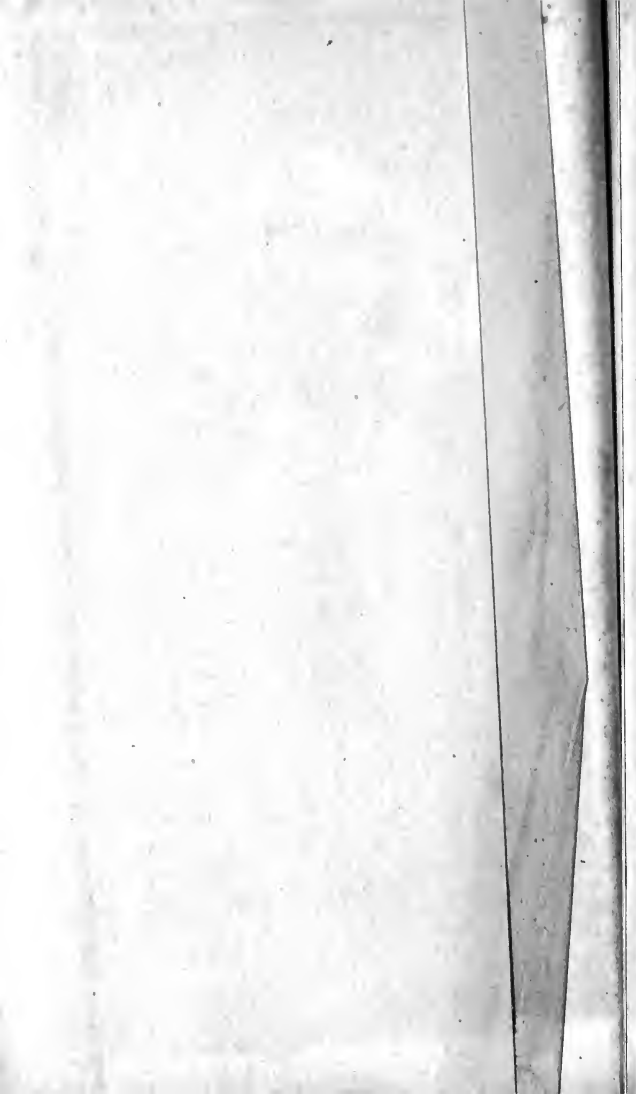


PLATE 3.



RANDALL









Wm Seal

3 years

\$ 500

David Collins

~~11~~ 6 4 years

\$ 500

Wm Senggs

8 years

\$ 500

Gas. Wood

6 months improvement

J B 7 years

6 months improvement



